



New Jersey Assessment of Skills and Knowledge

2011

TECHNICAL REPORT

Grades 3-8

April 2012

PTM 1507-87

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PART 1: INTRODUCTION

The purpose of this Technical Report is to provide information about the technical characteristics of the 2011 administration of the New Jersey Assessment of Skills and Knowledge (NJ ASK) for grades 3 through 8. This report is intended for use by those who evaluate tests, interpret scores, or use test results for making educational decisions. It includes the following sections: test development, test administration, scoring, standard setting, item and test statistics, equating and scaling, reliability, validity, and score reporting.

This report provides extensive detail about the development and operation of NJ ASK. The traditional concerns with a program are often labeled reliability and validity. The empirical reliability and validity of the assessments are reported explicitly in this document. While reliability (Part 8) is relatively straightforward, the steps in creating the program and putting it into operation are all aspects of validity (Part 9). The validity of any assessment stems from the steps taken in planning it, the processes of developing the content of the tests, the processes of consulting with stakeholders, the processes of communicating about the test with users, the processes of scoring and reporting, and the processes of data analysis. Each is an integral part of validity.

Data for the analyses presented in this Technical Report were collected during the spring administration in May 2011. The short time duration between test administration and score reporting necessitated the use of a priority sample for the equating/scaling analyses presented in Part 7 – Equating and Scaling.

A priority sample consists of a sub-group (approximately 30%) of the entire state student population that contains a representative sample of students from across the state based on ethnicity, gender and District Factor Group (DFG), a measure of socioeconomic status (see Section 6.5). The answer documents from the selected priority sample are scored and prioritized such that the results from this group are available for score-reporting-timeline-driven-analyses. The entire student population test results were utilized in less time sensitive analyses such as those reported in Part 6 – Item and Test Statistics and Part 8 – Reliability. The student N-counts are provided for each analysis in order for the reader to quickly ascertain whether the total student population or a sub-group was used for a given analysis.

In reading this technical report, it is critical to remember that the testing program does not exist in a vacuum; it is not just a test. It is one part of a complex network intended to help schools focus their energies on dramatic improvement in student learning. NJ ASK is an integrated program of testing, accountability, and curricular and instructional support. It can only be evaluated properly within this full context. Detailed descriptions of the NJ ASK 2011 3–8 are provided in Sections 2.2 and 2.3.

1.1 Description of the Assessment

The NJ ASK was administered as an operational assessment in Spring 2011 to students in grades 3 through 8. It consisted of two content areas in grades 3, 5, 6, and 7 - Language Arts Literacy (LAL) and mathematics, and three content areas in grades 4 and 8 - LAL, mathematics, and science. The NJ ASK is designed to give an early indication of the progress students are making in mastering the knowledge and skills described in New Jersey's Core Curriculum Content Standards (CCCS). In addition, these assessments fulfill the requirements under the 2001 No Child Left Behind (NCLB) Act.

In 2008, grades 5 through 8 assessments were redesigned as NJ ASK 5–8. Grades 5 through 7 of the new ASK 5–8 replaced the interim ASK 5–7 administered in 2006 and 2007. For grade 8, ASK 8 replaced the Grade Eight Proficiency Assessment (GEPA), marking 2007 as the last GEPA administration; however, the ASK 8 science test design remains unchanged from GEPA. In 2009, LAL and mathematics assessments in grades 3 and 4 were also redesigned.

New Jersey's statewide assessments currently include the following components, with versions in both English and Spanish:

Elementary School:

- Grade 3 New Jersey Assessment of Skills and Knowledge (ASK)
- Grade 4 New Jersey Assessment of Skills and Knowledge (ASK)

Middle School:

- Grade 5 New Jersey Assessment of Skills and Knowledge (ASK)
- Grade 6 New Jersey Assessment of Skills and Knowledge (ASK)
- Grade 7 New Jersey Assessment of Skills and Knowledge (ASK)
- Grade 8 New Jersey Assessment of Skills and Knowledge (ASK)

High School:

- High School Proficiency Assessment (HSPA)

In addition, the statewide assessment program currently includes two tests for special populations:

- Alternate Proficiency Assessment (APA), for students with the most significant cognitive disabilities
- Alternative High School Assessment (AHSA), (formerly SRA) for students who have not demonstrated proficiency in one or more content areas of the HSPA

It is important to note that the results from the redesigned NJ ASK 3–8 LAL and Mathematics assessments cannot be compared with those of previous assessments due to changes in the test designs for grades 5–8 in 2008 and grades 3 and 4 in 2009. The redesigned NJ ASK 3–8 for LAL and Mathematics differ significantly in terms of item type, passage length, and testing

time. Therefore direct comparisons of student performance across these assessments are inappropriate and should not be made.

The NJ ASK Language Arts Literacy and Mathematics scores at grades 3–8 and Science scores at grades 4 and 8 are reported as scale scores, with score ranges as follows:

- Partially Proficient 100–199
- Proficient 200–249
- Advanced Proficient 250–300

The scores of students who are included in the Partially Proficient level are considered to be below the state minimum of proficiency and those students may be most in need of instructional support. The standard-setting procedures used in 2008 and 2009 for determining proficiency levels are detailed in Part 5 of the 2009 technical report.

1.2 Purpose of the Assessment

New Jersey's state-required assessment program was designed to measure the extent to which all students at the elementary-, middle-, and secondary-school levels have attained New Jersey's CCCS.

As a result of the NCLB requirements, New Jersey established additional statewide assessments in grades 3 through 8 and high school. The statewide assessments for elementary and middle school grades are administered annually as the New Jersey Assessment of Skills and Knowledge (NJ ASK) in language arts literacy and mathematics at grades 3 through 8 and in science at grades 4 and 8. Testing is conducted in the spring of each year to allow school staff and students the greatest opportunity to achieve the goal of Proficiency.

Schools and districts should use the results to identify strengths and weaknesses in their educational programs. This process is designed to improve instruction and foster better alignment with the CCCS. The results may also be used, along with other indicators of student progress, to identify those students who may need instructional support in any of the content areas. This support, which could be in the form of individual or programmatic intervention, would be a means to address any identified knowledge or skill gaps.

1.3 Organizational Support

New Jersey's Office of State Assessments (OSA) coordinates the development and implementation of the NJ ASK 3–8. In addition to planning, scheduling, and directing all NJ ASK activities, the staff is extensively involved in numerous test design, item and statistical reviews, security, quality-assurance and analytical procedures. Measurement Incorporated (MI) is the contractor for NJ ASK Grades 3–8, is responsible for all aspects of the testing program including activities such as program management, development of test materials (test items, test booklets, answer documents, and ancillary materials), and psychometric support, including standard setting. MI's other activities include enrollment verification; distribution of all materials; receiving, scanning, editing, and scoring the answer documents; scoring constructed-response items; and creating, generating, and distributing all score reports of test results to students, schools, districts, and the state.

PART 2: TEST DEVELOPMENT

In 2008–2009, the LAL and mathematics assessments in grades 3 and 4 were redesigned to reflect the new test design features implemented in 2007–2008 in grades 5 through 8. As with grade 8 science, the design of grade 4 science assessment remained unchanged. The redesign changes in grades 5–8 described below were also applied to the grade 3 and 4 assessments in 2008 – 2009.

Overall

- NJ ASK grade 8 replaced GEPA in LAL, mathematics, and science
- NJ ASK grades 5, 6, and 7 were revised and replaced the interim ASK 5–7 administered in 2006 and 2007
- Spanish versions of the assessments in all content areas were included
- Test was administered later in school year (April/May)

Language Arts Literacy (LAL)

- Reading passages – more, shorter in length, more diverse in content
- Writing prompts – two prompts
- Test items and score points in total - increased

Mathematics

- Two days (grades 5-7) instead of one
- New item type: short constructed response (SCR)
- Test items and score points in total - increased

A directory of test specifications and sample items was developed for each content area. These specifications describe the test, format of the items, and the scores to be generated by the test. The material in the test specifications is designed for use by curriculum specialists and teachers to improve instruction at the district, school, and classroom levels. This document serves as the foundation for all test item development.

2.1 Test Specifications

The NJ ASK 2011 3-8 was designed to measure the knowledge and skills identified in the 2004 revision of the NJ CCCS. Brief descriptions of the test content measured in LAL, mathematics, and science are presented in the following sections. Table 2.1.1 details the total possible points by grade and content area. Table 2.1.2 shows the skills assessed by each content cluster. An in-depth discussion of the composition of the Language Arts Literacy (LAL), mathematics, and science assessments can be found in the 2009 NJ ASK Technical Report (PTM 1507-34), Part 2 , section 2.1.

The following tables provide information about item type, content cluster, and total point value by test section. Table 2.1.1 summarizes the total points possible for each of the content areas of the operational NJ ASK administered in 2011 for grades 3 through 8. Table 2.1.2 shows the number of items by content cluster and skill.

Table 2.1.1: NJ ASK 2011 3–8 Total Points Possible by Content Area

Language Arts Literacy	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Total	50 points	56 points	62 points	70 points	70 points	70 points
Writing	20	20	20	18	18	18
Persuasive/Speculative Prompt	10*	10*	10*	12*	12*	12*
Explanatory/ Expository Prompt	10*	10*	10*	6	6	6
Reading	30	36	42	52	52	52
Working with Text	12	14	17	21	20	23
Analyzing Text	18	22	25	31	32	29
Mathematics	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Total	50 points	50 points	50 points	49 points	49 points	49 points
Number & Numerical Operations	20	20	18	13	13	13
Geometry & Measurement	11	11	16	14	14	14
Patterns & Algebra	11	11	8	14	14	14
Data Analysis, Prob., & Discrete Math	8	8	8	8	8	8
Problem Solving	14	20	22	29	27	34
Calculator Usage	11	11	26	26	26	26
Science	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Total	39 points		-	-	-	54 points
Life Science	16	-	-	-	-	25
Physical Science	12	-	-	-	-	17
Earth Science	11	-	-	-	-	12
Knowledge	3	-	-	-	-	7
Application	36	-	-	-	-	47

*Scores doubled

Table 2.1.2: NJ ASK 2011 3–8 Number of Items by Content Cluster and Skill

Language Arts Literacy*		Grade 3		Grade 4		Grade 5		Grade 6		Grade 7		Grade 8	
Skill		W	A	W	A	W	A	W	A	W	A	W	A
Writing (2 Items)		0	0	0	0	0	0	0	0	0	0	0	0
Reading		12	9	14	13	17	16	21	19	20	20	23	17
Total		12	9	14	13	17	16	21	19	20	20	23	17
Mathematics**		Grade 3		Grade 4		Grade 5		Grade 6		Grade 7		Grade 8	
Skill		PS	CU	PS	CU	PS	CU	PS	CU	PS	CU	PS	CU
Number & Numerical Operations		4	2	4	2	5	8	8	5	5	5	7	7
Geometry & Measurement		2	1	3	5	4	7	4	8	4	5	7	6
Patterns & Algebra		0	3	2	0	3	4	6	4	7	8	10	5
Data Analysis, Prob., & Discrete Math		2	3	5	2	4	3	5	5	5	4	4	4
Total		8	9	14	9	16	22	23	22	21	22	28	22
Science***		Grade 4								Grade 8			
Skill		A	K							A	K		
Life Science		12	1									19	2
Physical Science		9	1									13	4
Earth Science		10	1									11	1
Total		31	3									43	7

*W = Working with Text, A = Analyzing Text, **PS= Problem Solving, CU = Calculator Usage, ***K = Knowledge, A = Application

Test Blueprints

The following tables outline the test construction blueprints. The actual test map for each grade and content area for the NJ ASK 2011 3–8 is included.

Table 2.1.3: Test Construction Map for NJ ASK 3–5 Language Arts Literacy

Text types/Strand (additional field test content embedded throughout)	Reading Sections	MC (Number of Items)	OE (Number of Items)	Writing Tasks (Number of Items)	Time on Task(s) in Minutes	Total Points
Writing (Speculative or Expository)				2	30 minutes each	20 (10 points each)*
Reading Passages	3	18 (Grade 3) 24 (Grade 4) 30 (Grade 5)	3 (Grade 3) 3 (Grade 4) 3 (Grade 5)		30 minutes each	30** (Grade 3) 36** (Grade 4) 42** (Grade 5)
Total	3	18 (Grade 3) 24 (Grade 4) 30 (Grade 5)	3 (Grade 3) 3 (Grade 4) 3 (Grade 5)	2	150 minutes	50 (Grade 3) 56 (Grade 4) 62 (Grade 5)

*Grades 3 – 5 utilize a 5-point scoring rubric. **O/E items in the reading passages are scored on a 0 – 4 scoring rubric.

Table 2.1.4: Actual Test Map for 2011 Grade 3 Language Arts Literacy NJ ASK

CLUSTER	MACRO	MC (1 pt.)	OE (4 pts.)	# of Items	# of Points
Analyzing Text (A)	1	0	0	0	0
	2	0	1	1	4
	3	0	2	2	8
	4	4	0	4	4
	5	2	0	2	2
A Total		6	3	9	18
Working with Text (W)	1	2	0	2	2
	2	3	0	3	3
	3	2	0	2	2
	4	3	0	3	3
	5	2	0	2	2
W Total		12	0	12	12
WRITE	EXPOSITORY	1	1	1	10
WRITE	EXPOSITORY	1	1	1	10
Total Writing		2	2	20	
Grand Total		18	5	23	50

Table 2.1.5: Actual Test Map for 2011 Grade 4 Language Arts Literacy NJ ASK

CLUSTER	MACRO	MC (1 pt.)	OE (4 pts.)	# of Items	# of Points
Analyzing Text (A)	1	0	0	0	0
	2	1	0	1	1
	3	0	0	0	0
	4	5	3	8	17
	5	4	0	4	4
A Total		10	3	13	22
Working with Text (W)	1	2	0	2	2
	2	2	0	2	2
	3	3	0	3	3
	4	3	0	3	3
	5	4	0	4	4
W Total		14	0	14	14
WRITE	EXPOSITORY		1	1	10
WRITE	EXPOSITORY		1	1	10
Total Writing		2	2	20	
Grand Total		24	5	29	56

Table 2.1.6: Actual Test Map for 2011 Grade 5 Language Arts Literacy NJ ASK

CLUSTER	MACRO	MC (1 pt.)	OE (4 pts.)	# of Items	# of Points
Analyzing Text (A)	1	0	0	0	0
	2	3	0	3	3
	3	0	1	1	4
	4	5	1	6	9
	5	5	1	6	9
A Total		13	3	16	25
Working with Text (W)	1	3	0	3	3
	2	3	0	3	3
	3	4	0	4	4
	4	4	0	4	4
	5	3	0	3	3
W Total		17	0	17	17
WRITE	SPECULATIVE		1	1	10
WRITE	EXPOSITORY		1	1	10
Total Writing		2	2	20	
Grand Total		30	5	35	62

Table 2.1.7: Test Construction Map for NJ ASK 6–8 Language Arts Literacy

Text types/Strand (additional field test content embedded throughout)	Reading Sections	MC (Number of Items)	OE (Number of Items)	Writing Tasks (Number of Items)	Time on Task(s) in Approximate Minutes	Total Points
Persuasive Prompt				1	45	12*
Explanatory Prompt				1	30***	6*
Reading Passages	4	36	4		30	52**
Total	4	36	4	2	195	70

*Grades 6-8 utilize a 6-point rubric. **O/E items in the reading passages are scored on a 0-4 scoring rubric. ***Increased from 25 minutes each previously.

Table 2.1.8: Actual Test Map for 2011 Grade 6 Language Arts Literacy NJ ASK

CLUSTER	MACRO	MC (1 pt.)	OE (4 pts.)	# of Items	# of Points
Analyzing Text (A)	1	0	0	0	0
	2	2	0	2	2
	3	0	2	2	8
	4	10	2	12	18
	5	3	0	3	3
A Total		15	4	19	31
Working with Text (W)	1	4	0	4	4
	2	3	0	3	3
	3	7	0	7	7
	4	5	0	5	5
	5	2	0	2	2
	6	0	0	0	0
W Total		21	0	21	21
WRITE	PERSUASIVE	1	1	12	
WRITE	EXPLANATORY	1	1	6	
Total Writing		2	2	18	
Grand Total		35	6	42	70

Table 2.1.9: Actual Test Map for 2011 Grade 7 Language Arts Literacy NJ ASK

CLUSTER	MACRO	MC (1 pt.)	OE (4 pts.)	# of Items	# of Points
Analyzing Text (A)	1	0	0	0	0
	2	1	0	1	1
	3	0	3	3	12
	4	9	1	10	13
	5	6	0	6	6
A Total		16	4	20	32
Working with Text (W)	1	3	0	3	3
	2	3	0	3	3
	3	6	0	6	6
	4	3	0	3	3
	5	5	0	5	5
	6	0	0	0	0
W Total		20	0	20	20
WRITE	PERSUASIVE	1	1	1	12
WRITE	EXPLANATORY	1	1	1	6
Total Writing		2	2	18	
Grand Total		36	6	42	70

Table 2.1.10: Actual Test Map for 2011 Grade 8 Language Arts Literacy NJ ASK

CLUSTER	MACRO	MC (1 pt.)	OE (4 pts.)	# of Items	# of Points
Analyzing Text (A)	1	0	0	0	0
	2	2	0	2	2
	3	0	2	2	8
	4	7	2	9	15
	5	4	0	4	4
A Total		13	4	17	29
Working with Text (W)	1	4	0	4	4
	2	3	0	3	3
	3	8	0	8	8
	4	5	0	5	5
	5	2	0	2	2
	6	1	0	1	1
W Total		23	0	23	23
WRITE	PERSUASIVE	1	1	1	12
WRITE	EXPLANATORY	1	1	1	6
Total Writing		2	2	18	
Grand Total		36	6	42	70

Table 2.1.11: Test Construction Map for NJ ASK 3-5 Mathematics

MC – multiple choice, 1 raw score point

SCR – short constructed-response, 1 raw score point

ECR – extended constructed-response, 3 raw score points

		Grade 3 (1 calculator active part)	Grade 4 (1 calculator active part)	Grade 5 (3 calculator active parts)
Item Count by Type (does not include embedded field test content)	MC	35	35	33
	SCR	6	6	8
	ECR	3	3	3
Total raw score points possible		50	50	50
Approximate total testing time (including field test content)		131 minutes	131 minutes	136 minutes

Table 2.1.12: Actual Test Map for 2011 Grade 3 Mathematics NJ ASK

STANDARD	STRAND	MC (1 pt.)	ECR (3 pts.)	SCR (1 pt.)	# of Items	# of Points
1	A	6	1	2	9	11
	B	3	0	3	6	6
	C	2	0	1	3	3
<i>1 Total</i>		11	1	6	18	20
2	A	3	0	0	3	3
	B	1	0	0	1	1
	C	1	0	0	1	1
	D	2	0	0	2	2
	E	1	1	0	2	4
<i>2 Total</i>		8	1	0	9	11
3	A	3	0	0	3	3
	B	3	0	0	3	3
	C	3	0	0	3	3
	D	2	0	0	2	2
<i>3 Total</i>		11	0	0	11	11
4	A	2	0	0	2	2
	B	2	0	0	2	2
	C	0	1	0	1	3
	D	1	0	0	1	1
<i>4 Total</i>		5	1	0	6	8
Grand Total		35	3	6	44	50

Table 2.1.13: Actual Test Map for 2011 Grade 4 Mathematics NJ ASK

STANDARD	STRAND	MC (1 pt.)	ECR (3 pts.)	SCR (1 pt.)	# of Items	# of Points
1	A	4	0	2	6	6
	B	4	1	2	7	9
	C	3	0	2	5	5
<i>1 Total</i>		11	1	6	18	20
2	A	2	0	0	2	2
	B	2	0	0	2	2
	C	1	1	0	2	4
	D	1	0	0	1	1
	E	2	0	0	2	2
<i>2 Total</i>		8	1	0	9	11
3	A	2	0	0	2	2
	B	1	1	0	2	4
	C	2	0	0	2	2
	D	3	0	0	3	3
<i>3 Total</i>		8	1	0	9	11
4	A	2	0	0	2	2
	B	2	0	0	2	2
	C	2	0	0	2	2
	D	2	0	0	2	2
<i>4 Total</i>		8	0	0	8	8
Grand Total		35	3	6	44	50

Table 2.1.14: Actual Test Map for 2011 Grade 5 Mathematics NJ ASK

STANDARD	STRAND	MC (1 pt.)	ECR (3 pts.)	SCR (1 pt.)	# of Items	# of Points
1	A	4	1	1	6	8
	B	5	0	2	7	7
	C	3	0	0	3	3
<i>1 Total</i>		12	1	3	16	18
2	A	2	0	1	3	3
	B	2	0	0	2	2
	C	2	0	0	2	2
	D	3	0	0	3	3
	E	2	1	1	4	6
<i>2 Total</i>		11	1	2	14	16
3	A	1	0	0	1	1
	B	1	1	0	2	4
	C	1	0	0	1	1
	D	1	0	1	2	2
<i>3 Total</i>		4	1	1	6	8
4	A	2	0	0	2	2
	B	1	0	1	2	2
	C	2	0	1	3	3
	D	1	0	0	1	1
<i>4 Total</i>		6	0	2	8	8
Grand Total		33	3	8	44	50

Table 2.1.15: Test Construction Map for NJ ASK 6–8 Mathematics

MC – multiple choice, 1 raw score point

SCR – short constructed-response, 1 raw score point

ECR – extended constructed-response, 3 raw score points

		Grade 6 (3 calculator active parts)	Grade 7 (3 calculator active parts)	Grade 8 (3 calculator active parts)
Item Count by Type (does not include embedded field test content)	MC	32	32	32
	SCR	8	8	8
	ECR	3	3	3
Total raw score points possible		49	49	49
Approximate total testing time (including field test content)		133 minutes	133 minutes	133 minutes

Table 2.1.16: Actual Test Map for 2011 Grade 6 Mathematics NJ ASK

STANDARD	STRAND	MC (1 pt.)	ECR (3 pts.)	SCR (1 pt.)	# of Items	# of Points
1	A	5	0	1	6	6
	B	3	0	2	5	5
	C	2	0	0	2	2
<i>1 Total</i>		10	0	3	13	13
2	A	3	0	1	4	4
	B	2	0	0	2	2
	C	1	0	0	1	1
	D	2	0	0	2	2
	E	1	1	1	3	5
<i>2 Total</i>		9	1	2	12	14
3	A	2	0	1	3	3
	B	2	0	0	2	2
	C	3	0	0	3	3
	D	2	1	1	4	6
<i>3 Total</i>		9	1	2	12	14
4	A	1	0	1	2	2
	B	1	0	0	1	1
	C	1	1	0	2	4
	D	1	0	0	1	1
<i>4 Total</i>		4	1	1	6	8
Grand Total		32	3	8	43	49

Table 2.1.17: Actual Test Map for 2011 Grade 7 Mathematics NJ ASK

STANDARD	STRAND	MC (1 pt.)	ECR (3 pts.)	SCR (1 pt.)	# of Items	# of Points
1	A	3	1	1	5	7
	B	3	0	1	4	4
	C	2	0	0	2	2
<i>1 Total</i>		8	1	2	11	13
2	A	2	1	1	4	6
	B	2	0	0	2	2
	C	2	0	1	3	3
	D	1	0	0	1	1
	E	2	0	0	2	2
<i>2 Total</i>		9	1	2	12	14
3	A	3	0	0	3	3
	B	2	0	0	2	2
	C	2	1	1	4	6
	D	2	0	1	3	3
<i>3 Total</i>		9	1	2	12	14
4	A	2	0	0	2	2
	B	1	0	1	2	2
	C	2	0	1	3	3
	D	1	0	0	1	1
<i>4 Total</i>		6	0	2	8	8
Grand Total		32	3	8	43	49

Table 2.1.18: Actual Test Map for 2011 Grade 8 Mathematics NJ ASK

STANDARD	STRAND	MC (1 pt.)	ECR (3 pts.)	SCR (1 pt.)	# of Items	# of Points
1	A	3	0	1	4	4
	B	3	1	0	4	6
	C	2	0	1	3	3
<i>1 Total</i>		8	1	2	11	13
2	A	2	1	1	4	6
	B	1	0	0	1	1
	C	2	0	0	2	2
	D	3	0	0	3	3
	E	1	0	1	2	2
<i>2 Total</i>		9	1	2	12	14
3	A	3	0	0	3	3
	B	1	1	0	2	4
	C	3	0	0	3	3
	D	2	0	2	4	4
<i>3 Total</i>		9	1	2	12	14
4	A	2	0	0	2	2
	B	1	0	1	2	2
	C	2	0	1	3	3
	D	1	0	0	1	1
<i>4 Total</i>		6	0	2	8	8
Grand Total		32	3	8	43	49

Table 2.1.19: Test Construction Map for NJ ASK 4 and 8 Science

Science assessment includes four parts-

Each multiple choice item is worth one point; each constructed response item is worth up to three points.

Each constructed response item is scored using an item-specific rubric

Life Science – 40% of the test

Physical science – 30% of the test

Earth Science – 30% of the test

		Grade 4	Grade 8
Item Count by Type (does not include field test content)	MC	33	48
	CR	2	2
Total raw score points possible		39	54
Approximate total testing time (includes field test content)		60 min.	120 min.

Table 2.1.20: Actual Test Map for 2011 Grade 4 Science NJ ASK

Cluster	Cog/Prob	MC (1 pt.)	CR (3 pts.)	# of Items	# of Points
Earth	Application	10	0	10	10
	Knowledge	1	0	1	1
<i>Earth Total</i>		11	0	11	11
Life	Application	12	1	13	15
	Knowledge	1	0	1	1
<i>Life Total</i>		13	1	14	16
Physical	Application	8	1	9	11
	Knowledge	1	0	1	1
<i>Physical Total</i>		9	1	10	12
Grand Total		33	2	35	39

Table 2.1.21: Actual Test Map for 2011 Grade 8 Science NJ ASK

Cluster	Cog/Prob	MC (1 pt.)	CR (3 pts.)	# of Items	# of Points
Earth	Application	11	0	11	11
	Knowledge	1	0	1	1
<i>Earth Total</i>		12	0	12	12
Life	Application	17	2	19	23
	Knowledge	2	0	2	2
<i>Life Total</i>		19	2	21	25
Physical	Application	13	0	13	13
	Knowledge	4	0	4	4
<i>Physical Total</i>		17	0	17	17
Grand Total		48	2	50	54

2.2 Development of Test Items

The NJ ASK consists of two types of items:

1. Operational items used to determine students' scores and
2. Field-test items evaluated for use as future base test items.

In the item development process, MI developed test and item specifications based upon requirements of the New Jersey Core Curriculum Content Standards (CCCS). Details regarding the item development process can be found in the 2009 NJ ASK Technical Report (PTM 1507-34), Part 2, section 2.2.

Test Form Distribution

Before Spring of 2008, the NJ DOE developed items for the NJ ASK using a standalone field-test format. Beginning with the operational administration in Spring of 2008, the NJ DOE began embedding field-test items for LAL, mathematics, and science. Thus, twenty-four forms of the NJ ASK 2011 assessments were distributed to New Jersey schools. Each of the 24 test forms at each grade level included identical base test items or operational items as well as field-test items. Note that students earned scores only on operational items. The 24 field test forms were assigned to school districts such that each district has one and only one test form, except in the case of unusually large districts (i.e., Jersey City, Newark, and Patterson), which received two forms. Moreover, the field test forms were distributed across ethnic groups and DFG classifications, such that each group or classification was represented across each form. Finally, approximately equal numbers of students (approximately 4,500) were given each test form. Tables showing the final form distribution plan, by test form, grade, and DFG classification can be found in Appendix A.

Information regarding the Item Review Process, Item Use, Test Forms Assembly, and Quality Control for Test Construction can also be found in the 2009 NJ ASK Technical Report (PTM 1507-34), Part 2, sections 2.3 through 2.6, respectively.

PART 3: TEST ADMINISTRATION

Great care is taken to ensure standard administration of the NJ ASK. Close attention to details is necessary to ensure that students taking the test in different locations have equal opportunities for success. Information about the administration of NJ ASK is available in the Test Coordinator Manual (*New Jersey Assessment of Skills & Knowledge Spring 2011 Test Coordinator Manual Grades 3–8*). That information is not fully replicated here, but the following elements are of importance to this technical report.

3.1 Participation

State regulations require that all students be included in the statewide assessment program and assessed annually. This includes limited English proficient (LEP) students and students with disabilities. Beginning in school year 2001–2002, students with severe cognitive disabilities were administered the Alternative Proficiency Assessment (APA) for the first time statewide.

All public schools, including those without assessed grades, are counted in the state's accountability system. All schools without assessed grades are counted as one unit with their respective receiving schools. This helps ensure closer vertical alignment of instructional services. In addition, special education students served in proprietary schools are counted in the sending schools' accountability results, which ensure that placement decisions are reviewed closely at the school and district level for optimum student academic performance.

New Jersey does not include in the accountability system the results of any student enrolled less than one full academic year in a school for school accountability, or in a district for district accountability. This does not exclude from a district's accountability the results of those students who transfer from one school to another within a district.

3.2 Test Security Procedures

The NJ ASK test booklets and its contents were treated as secure materials. Detailed procedures for maintaining the security of test materials while they were in the districts were outlined in the *New Jersey Assessment of Skills & Knowledge Spring 2011 Test Coordinator Manual Grades 3–8*. It was the responsibility of the district to guarantee the security of the test materials. Examiners, proctors, and other school personnel were prohibited from copying, reading, discussing, or disclosing any test items before, during, or after test administration. When not being used during a test period, test materials were stored in a secure, locked location that was accessible only to individuals whose access was authorized by the school test coordinator. Inventory forms tracked test materials as they moved from one location to another in districts.

As part of the test development procedures, “breach” test forms and examiner manuals were prepared in the event of a security breach. If the NJ DOE identified a security breach during the test administration window, MI immediately removed the NJ ASK test materials from the involved district or school. The test booklets for the content area affected were coded with a void code indicating a security breach. If the NJ DOE determined that there was enough time for testing, the breach forms were delivered to the district and the test was administered to the

affected students in the content area impacted by the security breach. For students re-tested during the test administration window, scores were reported based on the breach form. If a security breach was identified after the testing window, the impacted test booklets were coded with a security breach void code and no test results were reported for that content area. However, students received a score for the content area not impacted by the security breach.

3.3 Test Administration Procedures

Detailed instructions for administering the NJ ASK were provided in the *New Jersey Assessment of Skills & Knowledge Spring 2011 Test Coordinator Manual Grades 3–8*. The NJ ASK 3–8 was administered according to the following schedule:

Table 3.3.1: NJ ASK 2011 Testing Window

Grade	Test Dates		Testing Time (minutes)*							
	<u>Regular testing</u>	<u>Make-up testing</u>	<u>LAL</u>	<u>Math</u>	<u>Science</u>	<u>Day 1</u>	<u>Day 2</u>	<u>Day 3</u>	<u>Day 4</u>	<u>Day 4/Day 5</u>
Grade 3	5/09/11 – 5/12/11	5/16/11 – 5/20/11				90	90	63	68	N/A
Grade 4	5/09/11 – 5/13/11	5/16/11 – 5/20/11				90	90	63	68	60
Grade 5	5/09/11 – 5/12/11	5/16/11 – 5/20/11				90	90	68	68	N/A
Grade 6	5/03/11 – 5/06/11	5/09/11 – 5/13/11				105	120-135	64	69	N/A
Grade 7	5/03/11 – 5/06/11	5/09/11 – 5/13/11				105	120-135	64	69	N/A
Grade 8	5/03/11 – 5/06/11	5/09/11 – 5/13/11				105	120-135	133	N/A	120

*Does not include administrative time

Testing was not to be scheduled immediately after an athletic event or an assembly. All test schedules were checked with the appropriate school officials to ensure that other school activities did not interfere with the test administration. Other test administration procedures included:

- All testing had to be scheduled in the morning. Exceptions included homebound and bedside students, as well as students attending out-of-district placements who were tested at that placement by staff from the student's home district.
- The district and school test coordinators (DTCs/STCs) were responsible for scheduling times and places for regular and make-up testing and for ensuring that all testing was completed according to the procedures and schedule described in the *Test Coordinator Manual* and in the *Examiner Manual*.
- Students who were required to test but were absent for the regular test administration had to be tested on the make-up dates.
- Students whose answer folders were voided during testing were considered to have attempted the test section. They were not allowed to retake or resume taking the voided test section during the make-up.

- Students who began a section of the test and did not complete it during the specified testing time were not allowed to complete the test section during the make-up period or any other time unless additional time was specified in their IEP or 504 plan.

3.4 Test Accommodations

To ensure that students are tested under appropriate conditions, the Department of Education has adopted test accommodations and modifications that may be used when testing special populations of students. The content of the test typically remains the same, but administration procedures, setting, and answer modes may be adapted. Students requiring accommodations must be tested in a separate location from general education students.

General education students receive no special testing accommodations other than the standard room setup and materials distribution described in the examiner's section of the Test Manual.

Limited English Proficient (LEP) students who do not take the Spanish form of the test are tested with one or more of these accommodations:

- Additional time up to 150% of the administration times indicated
- Translation of directions only to the student's native language
- Translations of passages, items, prompts, and tasks are NOT permitted
- Use of a bilingual dictionary, preferably one normally used by the student as part of the instructional program.

Students with Disabilities (SE/504) must take the NJ ASK unless their Individualized Education Program (IEP) specifically states that they take the Alternate Proficiency Assessment (APA) and not the NJ ASK.

Students who are eligible under Section 504 of the Rehabilitation Act of 1973 may be tested using modified testing procedures that must be specified in the student's 504 accommodation plan.

Visually impaired students may take either a Braille or large-print version of the test. Specific instructions for administering the Braille and large-print versions of the test are provided in the supplementary instructions for examiners administering these forms.

Students using the Braille test booklets:

- are instructed to bring a Braille ruler and a talking calculator to the test session.
- are instructed to skip some items identified in the Braille instructions. The spaces for these items must be left blank on the student answer folder.
- have answer folders transcribed from Braille version by the examiner.
- dictate their answers to the examiner or use a device that produces Braille.

For dictations and responses recorded in Braille:

- Students must indicate all punctuation and must spell all key words.
- Examiners must transcribe the Brailled responses into the regular answer folder.

Students using the large-print test booklets:

- mark their answers in the large-print answer folders.
- may be instructed to skip some questions. The spaces for these questions must be left blank in the student's large-print answer folder.
- dictate responses on constructed-response items and writing tasks, indicate all punctuation, and spell key words.

Accommodations and modifications of test administration procedures are listed in Appendix C of this report. Also, the accommodations and modifications are included in the Test Coordinator Manual.

If a student requires an accommodation or modification that is not listed, district staff are instructed to contact the Office of State Assessments, NJ ASK Coordinator. Accommodations or modifications are classified as follows:

A = Setting Accommodations

B = Scheduling Accommodations

C = Test Materials/Modifications

D = Test Procedures Modifications

Tables 3.4.1 – 3.4.2 provide counts of special education and Section 504 students. Not every special education and Section 504 student is tested with an accommodation or modification. Accommodations and modifications may be used separately or in combination. The use of multiple accommodations for individual students is common. These tables show the performance results of students classified as either special education or Section 504. Descriptive statistics are also provided for those students classified as Section 504 or special education who were tested without accommodations or modifications.

Table 3.4.1: Statistics for Students Classified as Special Education

Content										
Area	Grade	Accommodation	N	Mean	STD	Min	Max	%PP	%P	%AP
LAL	3	Yes	10824	182.65	23.68	100	300	73.50	26.08	0.42
		No	5076	203.89	26.94	100	300	39.74	53.70	6.56
	4	Yes	12692	175.49	29.54	100	300	75.38	23.90	0.72
		No	4282	201.16	33.15	100	300	39.21	55.11	5.67
	5	Yes	13524	179.32	25.45	100	294	75.88	23.70	0.42
		No	3127	199.55	30.80	100	300	45.09	50.78	4.13
	6	Yes	13594	183.35	24.13	100	280	74.13	25.41	0.46
		No	2697	194.59	29.69	118	293	54.76	41.71	3.52
	7	Yes	13843	176.16	28.88	100	300	77.45	21.66	0.90
		No	2205	184.11	35.63	100	300	64.85	30.93	4.22
	8	Yes	14076	196.86	22.98	113	300	53.41	44.90	1.69
		No	2096	202.94	27.94	122	300	45.61	48.23	6.15
Math	3	Yes	10857	204.40	41.41	100	300	44.36	38.95	16.69
		No	5083	232.55	41.93	100	300	20.72	39.25	40.04
	4	Yes	12729	202.22	38.55	100	300	44.83	43.48	11.70
		No	4283	227.71	40.55	100	300	21.95	46.88	31.17
	5	Yes	13553	201.26	37.36	100	300	49.07	38.52	12.41
		No	3126	228.64	42.39	100	300	24.76	38.71	36.53
	6	Yes	13614	193.62	32.57	100	300	56.64	37.36	6.00
		No	2701	208.47	39.97	100	300	40.10	41.65	18.25
	7	Yes	13834	179.92	34.18	100	300	72.44	23.28	4.28
		No	2212	190.14	41.74	100	300	61.26	27.71	11.03
	8	Yes	14027	180.32	36.13	100	300	70.33	24.40	5.28
		No	2089	191.86	44.72	100	300	57.97	29.06	12.97

Content Area	Grade	Accommodation	N	Mean	STD	Min	Max	%PP	%P	%AP
Science	4	Yes	12736	221.57	35.47	100	300	25.68	50.67	23.65
		No	4284	242.58	36.29	114	300	12.21	40.06	47.74
	8	Yes	14046	201.72	29.00	116	300	50.55	41.96	7.50
		No	2092	209.92	34.39	137	300	42.16	42.59	15.25

Table 3.4.2: Statistics for Students Classified as Section 504

Content Area	Grade	Accommodations	N	Mean	STD	Min	Max	%PP	%P	%AP
LAL	3	Yes	1857	201.16	22.83	123	300	44.91	51.32	3.77
		No	370	206.30	23.98	154	300	35.14	58.92	5.95
	4	Yes	2141	198.30	26.51	113	300	45.96	50.58	3.46
		No	431	206.17	29.01	108	293	36.43	56.84	6.73
	5	Yes	2186	200.47	24.15	121	287	45.33	52.33	2.33
		No	449	209.57	25.99	121	273	28.95	64.14	6.90
	6	Yes	2218	207.23	22.55	122	300	36.25	59.56	4.19
		No	482	210.41	23.30	143	281	31.74	62.24	6.02
	7	Yes	1959	206.41	27.13	117	300	39.46	52.94	7.61
		No	499	213.88	27.66	120	300	28.06	59.32	12.63
	8	Yes	1864	221.92	22.37	158	300	13.84	73.07	13.09
		No	584	225.85	24.08	153	300	11.99	72.43	15.58

Content										
Area	Grade	Accommodation	N	Mean	STD	Min	Max	%PP	%P	%AP
Math	3	Yes	1858	228.80	38.42	110	300	21.69	44.35	33.96
		No	372	233.15	40.31	126	300	20.16	38.44	41.40
	4	Yes	2140	223.93	36.58	100	300	22.80	51.92	25.28
		No	431	230.43	36.25	112	300	17.40	52.67	29.93
	5	Yes	2188	229.98	34.57	120	300	18.83	48.58	32.59
		No	447	237.53	35.78	128	300	12.98	47.20	39.82
	6	Yes	2217	223.40	32.63	123	300	21.34	56.56	22.10
		No	481	225.37	33.57	131	300	19.96	54.68	25.36
Science	7	Yes	1956	212.44	34.72	112	300	35.84	47.24	16.92
		No	498	221.77	38.52	112	300	27.51	45.18	27.31
	8	Yes	1864	220.46	37.69	100	300	27.41	48.77	23.82
		No	583	226.21	40.07	110	300	23.50	43.57	32.93
Science	4	Yes	2131	243.19	32.40	127	300	8.78	45.00	46.22
		No	431	248.05	31.41	145	300	5.57	39.68	54.76
	8	Yes	1859	229.96	30.53	131	300	14.58	58.42	27.00
		No	580	234.05	32.05	137	300	13.45	53.10	33.45

3.5 Reliability and Validity of Tests for Special Populations¹

Assessing the reliability and validity of the modifications made for the special populations is as important as assessing these psychometric properties of the operational tests. Reliability of assessment is the degree to which assessment results measure particular knowledge and skills. Validity of assessment is the degree to which an assessment measures what it is intended to measure and the extent to which the inferences made and actions taken on the basis of the assessment outcomes are accurate and appropriate. An assessment that is not reliable cannot be valid (AERA, APA, & NCME, 1999).

New Jersey state regulations require that all students be included in the statewide assessment program and assessed annually including limited English proficient (LEP) students and students with disabilities. Beginning in school year 2001–2002, students with severe cognitive disabilities were administered the Alternative Proficiency Assessment (APA) for the first time statewide. All public schools, including those without assessed grades, are counted in the state’s accountability system.

Given the high stakes nature of the tests for school accountability, it is important that the tests be reliable and valid. The NJ ASK tests are offered in English, Spanish, Braille, and Large Print; and students are allowed various accommodations as determined by the individualized education plan (IEP) and 504 plan. Spanish forms are offered for current limited English proficient (CLEP) students whose dominant language is Spanish, as identified by school districts. Alternate forms of the tests are generated for students who cannot participate in the regular administration of the tests.

The reliability and validity evidences for the 2011 NJ ASK tests for the regular and special population are documented in various parts of this report. A reliable test is one that produces scores that are expected to be relatively stable if the test is administered repeatedly under similar conditions for the general testing population and across subgroups. For evidence that a test is performing similarly across subgroups, the reliability values for these subgroups can be compared to those of the total population. Note that the reliability measures are impacted by the population distribution and can be lower when the subgroup is homogenous in performance. However, one would expect the subgroup reliabilities to be adequately high for all groups. The test reliabilities measured by Cronbach alpha for the 2011 NJASK tests are described in Part 8. The alphas for overall student responses ranged from 0.82 to 0.91 for LAL, 0.90 to 0.92 for math, and 0.84 to 0.90 for science indicating that the tests are highly reliable. The reliability of the tests for Spanish students only is lower than the general population, ranging from 0.73 to 0.85 for LAL, 0.81 to 0.89 for math, and 0.71 to 0.78 for science (see Table 8.1.1) which is still reasonable given the student population ($N < 910$). Reliability estimates for special education and limited English proficient students can also be found in Table 8.1.1. The reliabilities for these special populations are quite similar to the general population.

¹¹ Sato, E., Worth, P., Gallagher, C., Lagunoff, R., and McKeag, H., (2007). Guidelines for Ensuring the Technical Quality of Assessments Affecting English Language Learners and Students with Disabilities: Development and Implementation of Regulations

The reliability of the test and test scores is reflected in the evidence of rater consistency (i.e. inter-rater reliability). Although there is no separate inter-rater reliability analysis for CLEP students, the rater reliability coefficient for the total population shows relatively high agreement between the raters on the constructed-response items. The scoring processes are described in Part 4 and inter-rater reliability of test scores in constructed-response and writing items are presented in Part 8 of this report.

The 2011 NJ ASK tests validity evidence specifically for special populations are described here in terms of test content, test administration and response process, internal structure, and score reporting as proposed by Sato et. al (2007) for guidelines of evaluating reliability and validity of assessments.

The fact that all tests are constructed under same blueprint and specifications is evidence of content validity. The NJ ASK tests for special populations including Spanish, Braille, and Large Print versions are translated directly from the operational forms. The items are developed to align and measure the NJ core curriculum standards so that all students can demonstrate the knowledge and skills necessary for the attainment of English language proficiency and the language necessary for achievement in the academic content areas. All standards and assessments are reviewed by specialists from NJ content as well as bias and sensitivity review committees to identify and eliminate elements that may favor one group (e.g., language, culture, ethnicity) over another. Test items are developed under universal test design principle with NJ special student populations in mind so that no student group is disadvantaged. The test development process is described in Part 2 of this Technical report.

The test validity is also reflected in the fact that the test is inclusive for all students. In order to minimize or eliminate factors that contribute to assessment ambiguity and inaccuracy such that assessment results accurately reflect student knowledge and ability, various accommodations are provided to the special needs students based on their IEP or 504 plans. A list of acceptable test accommodations or modifications of test administrations is provided in Appendix C.

The test validity further ensures the comparability and interpretation of scores and proficiency standards across different student groups. All NJ ASK item responses for a given grade/content from the general and special populations are combined for item analysis, calibration, and equating. These analyses include all students regardless of the test version taken, i.e., operational, Spanish, Braille, or Large Print. An entirely different score conversion table is prepared for tests requiring modifications such that a subset of the total number of items constitutes the total score. However, these special test versions are placed on the same scale as the operational tests; thus, proficiency standards can be applied uniformly to all tests.

The performance of students from various groups including gender, ethnicity, special education, and LEP are reported at the school level. Table 6.5.8 presents mean and standard deviation of scale scores for Braille, Large Print, and Spanish test takers. As shown in this table, students from the sub-populations performed less well than the general population in all content areas. The number of students in the sub-groups is small, however.

PART 4: SCORING

4.1 Multiple-Choice Items

The answer keys approved by NJ DOE are used to score the multiple-choice items after the responses have been scanned. Each item has a key associated with the item (A, B, C, or D), which has been supplied and verified by the NJ ASK content specialists. All correct answers are assigned the value of “1” while incorrect answers are assigned the value of “0.” At no time in this process is the original scanned answer overwritten, in case the key is determined to be incorrect during the post-scoring quality assurance check. After scoring is completed, simple item statistics are provided to the appropriate NJ ASK content specialist to ensure that the correct keys are being applied. If a key changes, then the process is repeated until the scoring file is correct. The key-check data file contains the following information:

- percent of students getting the question correct (PC);
- correlation of the item to the test as a whole (RPB);
- correlation of each possible response option to the test as a whole (RPBA, RPBB, etc.);
- percentage of students choosing each response option (A, B, C, D or X-omits); and
- flags for items with high difficulty (DFLAG) or low correlations (CFLAG).

4.2 Constructed-Response Items

A discussion of the following topics germane to the scoring of constructed response items can be found in the 2009 NJ ASK Technical Report (PTM 1507-34), Part 4 , section 4.2.

- Scorer Selection
- Range Finding
- Field Test Range Finding
- Scoring Guides
- Team Leader Training and Qualifying
- Scorer Training/Qualifying
- Monitoring Scorer Performance

As the number of scoring personnel varies from year to year, Table 4.2.1 details the levels of staffing for scoring the 2011 NJ ASK. The table shows the numbers of scorers, team leaders and scoring directors at each grade level who participated in scoring.

Table 4.2.1: Scoring Personnel by Grade and Content Area - NJ ASK 2011

Content Area	Grade	Scorers	Team Leaders	Scoring Director
LAL				
	3	182	20	5
	4	169	17	6
	5	205	20	6
	6	174	16	6
	7	176	14	6
	8	202	19	6
Math				
	3	39	3	3
	4	61	4	3
	5	54	5	2
	6	48	4	4
	7	48	6	3
	8	36	4	3
Science				
	4	24	-	2
	8	31	-	2

As shown in Part 8, Reliability, the raters are not in perfect agreement 100% of the time. Thus to ensure that no student is unjustly penalized because a rater may have been a little too stringent, rescoreing is conducted automatically for any student who scores within one raw score point of the proficient cut score. MI reviews writing and constructed-response items and verifies the original scores or makes changes where warranted. Scores are never lowered during the automatic rescoreing process even if a lower score results. Districts do not need to request rescoreing. Table 4.2.2 provides automatic rescoreing information for each grade level and content area.

Table 4.2.2: Automatic Rescore Statistics - NJ ASK 2011

LAL	Grade	Eligible for Automatic Rescore	Score/Proficiency Changes	
		#	%*	
	3	5009	99	1.98
	4	4211	84	1.99
	5	3504	59	1.68
	6	3121	89	2.85
	7	3133	147	4.69
	8	1662	64	3.85

Mathematics	Grade		
	3	2025	143
	4	2145	62
	5	1767	47
	6	2384	151
	7	2779	128
	8	2762	138

Science	Grade		
	4	1878	34
	8	2264	16

*Percentage of eligible students whose scores changed

4.3 Quality Control²

In order to ensure the quality of the testing materials, MI and the NJ DOE work together to rigorously proof all materials prior to printing/production. The steps of the quality control procedures can be found in the 2009 NJ ASK Technical Report (PTM 1507-34), Part 4 , section 4.3.

² The NJ DOE checks all test result data for consistency, replicates reported summary data to ensure accuracy, and reviews all printed reporting materials to verify appropriateness. Additionally, the NJ DOE checks the recording and tallying of item scores.

PART 5: STANDARD SETTING

Two separate standard settings have been held for NJ ASK. The first was conducted after the first administration of the new NJ ASK grades 5 through 8 in April–May 2008 and the second occurred after the 2009 administration of the new NJ ASK assessments in grades 3 and 4.

Detailed information regarding these two standard settings can be found in the 2009 NJ ASK Technical Report (PTM 1507-34) and the New Jersey Assessment of Skills and Knowledge (NJ ASK) Standard Setting Report from 2008 and 2009. No recent standard settings have been held for science.

PART 6: ITEM and TEST STATISTICS

6.1 Classical Item Statistics

For each administration, classical item analyses were completed prior to item calibration, scaling, and equating. These statistics were calculated again once all of the data were available. These analyses involve computing a set of statistics based on classical test theory for every item in each form. Each statistic was designed to provide some key information about the quality of each item from an empirical perspective. The statistics estimated for the NJ ASK are described below.

- Classical item difficulty (“P-Value”):
This statistic indicates the percentage of examinees in the sample that answered the item correctly. Desired p-values generally fall within the range of 0.20 to 0.90.
- Item discrimination (“r-biserial”):
This statistic is measured by the poly-serial correlation between the item score and the test criterion score and describes the relationship between performance on the specific item and performance on the entire form. Higher values indicate greater differences in the performance of competent and less competent examinees. Items with negative correlations can indicate serious problems with the item content (e.g., multiple correct answers or unusually complex content), or can indicate that students have not been taught the content. For LAL, the test criterion score is the total score of all reading items (MC and OE) and the writing prompt. For mathematics, the test criterion score is the total score of all MC and CR (Extended Constructed Response (ECR) and Short Constructed Response (SCR) items. For science, the test criterion score is also the total score of all MC and CR items.
- The proportion of students choosing each response option:
These statistics indicate the percentage of examinees that select each of the available answer options and the percentage of examinees that omitted the item.
- Distractor analyses for MC items:
This statistic reports the percentage of examinees who select each incorrect response (distractor).
- Percentage of students omitting an item:
This statistic is useful for identifying problems with test features such as testing time and item/test layout. Typically, we would expect that if students have an adequate amount of testing time, 95% of students should attempt to answer each question.

When a pattern of omit percentages exceeds 5% for a series of items at the end of a timed section, this may indicate that there was insufficient time for students to complete all items. Alternatively, if the omit percentage is greater than 5% for a single item, this could be an indication of an item/test layout problem. For example, students might accidentally skip an item that follows a lengthy stem.

Item analyses were conducted for the 2011 NJ ASK 3–8 in the content areas of LAL, mathematics, and science. In this section, summary information is presented by grade at both the content domain and content cluster level. The information includes mean item scores and discrimination indices, as well as descriptive statistics for number correct raw score and for scale scores. Statistics include N-counts, means, standard deviations, minimum and maximum values, and a variety of data disaggregations, including student demographic group and DFG.

For multiple-choice (MC) items, the mean score is simply the proportion of students who gave a correct response to the item (usually referred to as item difficulty or the p-value), and the discrimination index is the point biserial correlation between the item score and the total score based on the remaining items.

For mathematics constructed-response (CR) items, the mean score is the mean of students' scores on a scale of 0 to 3 for the ECR items and a scale of 0 to 1 for the SCR items. The mean scores for the science CR items are based on a 0 to 3 point scale whereas the LAL OE mean scores are based on a 0 to 4 point scale. Writing is scored on a scale of 0 to 5 for grades 3–5 and 0 to 6 for grades 6–8. Note that the writing scores were doubled for the Persuasive prompt but not doubled for the explanatory prompt in data analyses and score reporting in grades 6–8. In grades 3–5, both writing prompt scores were doubled. The discrimination index is the correlation between the item score and the total score based on the remaining items.

Descriptive Statistics

Tables 6.1.1 through 6.1.6 summarize by item response format, item difficulty, and discrimination of the items that comprise each content domain and cluster for grades 3 through 8, respectively. For MC items, both the mean and standard deviation are given. The mean value is the average of the p-values of the items in the cluster. For CR items, the mean value is the average item score for the items in the cluster. Item discrimination is the correlation between students' item score and the total score of the remaining items on the test. Both item difficulty and discrimination are expressed in terms of the raw score metric.

Tables 6.1.7 through 6.1.12 summarize frequency distributions for MC item difficulty and discrimination indices of items comprising each content domain and cluster for grades 3 through 8, respectively. The median item difficulty and discrimination is also displayed.

Table 6.1.13 summarizes distractor analyses for MC items by test. The number in each cell indicates the number of items where at least one p-value or discrimination index (point-biserial) for the distractors was higher than the keyed option (answer identified as the correct response).

Table 6.1.1: Grade 3 - Item Difficulty and Discrimination Summary Statistics by Cluster

Test Section/ Cluster	Multiple-Choice					Constructed-Response ¹				
	Item Difficulty			Item Discrimination Mean	Item Difficulty			Item Discrimination Mean		
	Nitem	Mean	S.D.		Nitem	Mean	S.D.			
LAL	18	0.66	0.08	0.35						
Writing					WT1 ²	1	4.94	0.53		
Reading	18	0.66	0.08	0.35	WT2 ³	1	5.25	0.57		
Working with Text	12	0.65	0.09	0.35		-	-	-		
Analyzing Text	6	0.67	0.04	0.35		3	1.44	0.02	0.51	
Math	35	0.67	0.13	0.39	SCR	6	0.67	0.08	0.46	
Number and Numerical Operation	11	0.67	0.14	0.41	ECR	3	1.75	0.07	0.58	
Geometry and Measurement	8	0.71	0.08	0.35	SCR	6	0.67	0.08	0.46	
Patterns and Algebra	11	0.65	0.14	0.38	ECR	1	1.83	-	0.60	
Data Analysis, Probability, and Discrete Mathematics	5	0.62	0.13	0.40	SCR	0	-	-	-	
Problem Solving	5	0.75	0.07	0.38	ECR	1	1.71	-	0.52	
Calculator	8	0.68	0.13	0.41	SCR	0	-	-	-	
					ECR	1	1.71	-	0.62	

¹ For LAL OE items, the mean score is the mean of students' scores on a scale of 0 to 4. Writing is scored on a scale of 0 to 5 then doubled for grades 3 through 5. Note that in data analyses and score reporting, WT1 and WT2 scores were doubled. In mathematics, the constructed-response (CR) items consist of short constructed response (SCR) items scored on a scale from 0 to 1 and extended constructed response (ECR) items scored on a scale from 0 to 3.

² Writing Task One

³ Writing Task Two

Table 6.1.2: Grade 4 - Item Difficulty and Discrimination Summary Statistics by Cluster

Test Section/ Cluster	Multiple-Choice				Constructed-Response ¹			
	Item Difficulty		Item Discrimination		Item Difficulty		Item Discrimination	
	Nitem	Mean	S.D.	Mean	Nitem	Mean	S.D.	Mean
LAL	24	0.67	0.15	0.37	WT1 ²	1	5.84	0.51
Writing					WT2 ³	1	5.95	0.60
Reading	24	0.67	0.15	0.37		3	1.73	0.25
Working with Text	14	0.68	0.17	0.36		0		
Analyzing Text	10	0.66	0.12	0.38		3	1.73	0.25
Math	35	0.67	0.12	0.38	SCR	6	0.70	0.14
					ECR	3	1.60	0.39
Number and Numerical Operation	11	0.75	0.10	0.42	SCR	6	0.70	0.14
					ECR	1	1.96	-
Geometry and Measurement	8	0.62	0.10	0.35	SCR	0	-	-
					ECR	1	1.18	-
Patterns and Algebra	8	0.68	0.11	0.38	SCR	0	-	-
					ECR	1	1.67	-
Data Analysis, Prob., & Discrete Math	8	0.58	0.11	0.36	SCR	0	-	-
					ECR	0	-	-
Problem Solving	11	0.67	0.11	0.41	SCR	-	-	-
					ECR	3	1.60	0.39
Calculator	8	0.66	0.13	0.39	SCR	0		
					ECR	1	1.96	-
Science	33	0.68	0.12	0.33		2	1.38	0.51
Life Science	14	0.67	0.13	0.34		1	1.74	-
Physical Science	9	0.74	0.07	0.35		1	1.02	-
Earth Science	10	0.64	0.14	0.30		0	-	-
Comprehension/Recall	7	0.72	0.13	0.38		-	-	-
Application	22	0.66	0.12	0.31		2	1.38	0.51
Data Analysis	4	0.71	0.12	0.36		-	-	-

¹For LAL OE items, the mean score is the mean of students' scores on a scale of 0 to 4. Writing is scored on a scale of 0 to 6 for grades 6 through 8. Note that in data analyses and score reporting, WT1 scores were doubled. In mathematics, the constructed-response (CR) items consist of short constructed response (SCR) items scored on a scale from 0 to 1 and extended constructed response (ECR) items scored on a scale from 0 to 3. Science CR items are scored on a scale of 0 to 3.

²Writing Task One

³Writing Task Two

Table 6.1.3: Grade 5 - Item Difficulty and Discrimination Summary Statistics by Cluster

Test Section/ Cluster	Multiple-Choice					Constructed-Response ¹				
	Item Difficulty			Item Discrimination Mean	Item Difficulty			Item Discrimination Mean		
	Nitem	Mean	S.D.		Nitem	Mean	S.D.			
LAL	30	0.64	0.10	0.38						
Writing					WT1 ²	1	6.07	0.56		
Reading	30	0.64	0.10	0.38	WT2 ³	1	5.40	0.57		
Working with Text	17	0.65	0.12	0.39		3	1.29	0.13	0.46	
Analyzing Text	13	0.63	0.07	0.38		-	-	-	-	
						3	1.29	0.13	0.46	
Math	33	0.68	0.13	0.43	SCR	8	0.68	0.08	0.50	
Number and Numerical Operation	12	0.71	0.13	0.45	ECR	3	1.59	0.36	0.57	
Geometry and Measurement	11	0.64	0.15	0.41	SCR	3	0.72	0.06	0.51	
Patterns and Algebra	4	0.69	0.12	0.42	ECR	1	1.36	-	0.56	
Data Analysis, Probability, and Discrete Mathematics	6	0.67	0.09	0.44	SCR	2	0.58	0.11	0.46	
Problem Solving	12	0.66	0.12	0.43	ECR	1	1.40	-	0.68	
Calculator	20	0.68	0.13	0.45	SCR	1	0.72	-	0.49	
					ECR	1	2.00	-	0.47	
					SCR	2	0.71	0.03	0.52	
					ECR	-	-	-	-	
					SCR	1	0.69	-	0.54	
					ECR	3	1.59	0.36	0.57	
					SCR	-	-	-	-	
					ECR	2	1.70	0.42	0.57	

¹ For LAL OE items, the mean score is the mean of students' scores on a scale of 0 to 4. Writing is scored on a scale of 0 to 5 then doubled for grades 3 through 5. Note that in data analyses and score reporting, WT1 and WT2 scores were doubled. In mathematics, the constructed-response (CR) items consist of short constructed response (SCR) items scored on a scale from 0 to 1 and extended constructed response (ECR) items scored on a scale from 0 to 3.

² Writing Task One

³ Writing Task Two

Table 6.1.4: Grade 6 - Item Difficulty and Discrimination Summary Statistics by Cluster

Test Section/ Cluster	Multiple-Choice				Constructed-Response ¹			
	Item Difficulty		Item Discrimination		Item Difficulty		Item Discrimination	
	Nitem	Mean	S.D.	Mean	Nitem	Mean	S.D.	Mean
LAL	36	0.66	0.11	0.36	WT1 ²	1	6.65	0.61
Writing					WT2 ³	1	3.43	0.65
Reading	36	0.66	0.11	0.36		4	1.93	0.11
Working with Text	21	0.69	0.11	0.35		-	-	-
Analyzing Text	15	0.62	0.10	0.36		4	1.93	0.11
								0.56
Math	32	0.64	0.12	0.40	SCR	8	0.65	0.13
					ECR	3	1.56	0.33
Number and Numerical Operation	10	0.65	0.12	0.40	SCR	3	0.61	0.06
					ECR	-	-	-
Geometry and Measurement	9	0.64	0.13	0.39	SCR	2	0.52	0.13
					ECR	1	1.20	-
Patterns and Algebra	9	0.68	0.13	0.39	SCR	2	0.79	0.06
					ECR	1	1.64	-
Data Analysis, Probability, and Discrete Mathematics	4	0.56	0.10	0.39	SCR	1	0.72	-
					ECR	1	1.84	-
Problem Solving	17	0.59	0.13	0.39	SCR	3	0.58	0.16
					ECR	3	1.56	0.33
Calculator	20	0.64	0.12	0.41	SCR	-	-	-
					ECR	2	1.52	0.45
								0.65

¹ For LAL OE items, the mean score is the mean of students' scores on a scale of 0 to 4. Writing is scored on a scale of 0 to 6 for grades 6 through 8. Note that in data analyses and score reporting, WT1 scores were doubled. In mathematics, the constructed-response (CR) items consist of short constructed response (SCR) items scored on a scale from 0 to 1 and extended constructed response (ECR) items scored on a scale from 0 to 3.

² Writing Task One

³ Writing Task Two

Table 6.1.5: Grade 7 - Item Difficulty and Discrimination Summary Statistics by Cluster

Test Section/ Cluster	Multiple-Choice				Constructed-Response ¹			
	Item Difficulty			Item Discrimination	Item Difficulty			Item Discrimination
	Nitem	Mean	S.D.	Mean	Nitem	Mean	S.D.	Mean
LAL	36	0.63	0.12	0.35	WT1 ²	1	7.19	0.61
Writing					WT2 ³	1	3.45	0.61
Reading	36	0.63	0.12	0.35		4	1.94	0.13
Working with Text	20	0.64	0.07	0.36		-	-	-
Analyzing Text	16	0.62	0.17	0.35		4	1.94	0.13
								0.56
Math	32	0.60	0.13	0.41	SCR	8	0.66	0.11
					ECR	3	1.47	0.36
Number and Numerical Operation	8	0.59	0.08	0.45	SCR	2	0.53	0.16
					ECR	1	1.10	-
Geometry and Measurement	9	0.63	0.12	0.40	SCR	2	0.65	0.04
					ECR	1	1.51	-
Patterns and Algebra	9	0.59	0.17	0.41	SCR	2	0.71	0.03
					ECR	1	1.81	-
Data Analysis, Probability, and Discrete Mathematics	6	0.56	0.15	0.36	SCR	2	0.75	0.04
					ECR	-	-	-
Problem Solving	16	0.55	0.15	0.42	SCR	2	0.67	0.04
					ECR	2	1.46	0.50
Calculator	20	0.60	0.14	0.41	SCR	-	-	-
					ECR	2	1.46	0.50
								0.68

¹ For LAL OE items, the mean score is the mean of students' scores on a scale of 0 to 4. Writing is scored on a scale of 0 to 6 for grades 6 through 8. Note that in data analyses and score reporting, WT1 scores were doubled. In mathematics, the constructed-response (CR) items consist of short constructed response (SCR) items scored on a scale from 0 to 1 and extended constructed response (ECR) items scored on a scale from 0 to 3.

² Writing Task One

³ Writing Task Two

Table 6.1.6: Grade 8 - Item Difficulty and Discrimination Summary Statistics by Cluster

Test Section/ Cluster	Multiple-Choice				Constructed-Response ¹			
	Item Difficulty		Item Discrimination		Item Difficulty		Item Discrimination	
	Nitem	Mean	S.D.	Mean	Nitem	Mean	S.D.	Mean
LAL	36	0.70	0.09	0.41	WT1 ²	1	7.44	0.67
Writing					WT2 ³	1	3.62	0.64
Reading	36	0.70	0.09	0.41		4	2.14	0.18
Working with Text	23	0.71	0.09	0.43		-	-	-
Analyzing Text	13	0.68	0.09	0.39		4	2.14	0.18
Math	32	0.62	0.14	0.41	SCR	8	0.53	0.12
					ECR	3	1.21	0.28
Number and Numerical Operation	8	0.52	0.08	0.45	SCR	2	0.63	0.09
					ECR	1	1.53	-
Geometry and Measurement	9	0.70	0.12	0.38	SCR	2	0.44	0.05
					ECR	1	0.99	-
Patterns and Algebra	9	0.65	0.12	0.41	SCR	2	0.52	0.05
					ECR	1	1.12	-
Data Analysis, Probability, and Discrete Mathematics	6	0.58	0.17	0.39	SCR	2	0.56	0.22
					ECR	-	-	-
Problem Solving	21	0.61	0.14	0.40	SCR	4	0.53	0.13
					ECR	3	1.21	0.28
Calculator	20	0.61	0.15	0.43	SCR	-	-	-
					ECR	2	1.26	0.38
Science	48	0.65	0.10	0.36	2	1.68	0.05	0.55
Life Science	19	0.61	0.11	0.36	2	1.68	0.05	0.55
Physical Science	17	0.65	0.11	0.34	-	-	-	-
Earth Science	12	0.70	0.07	0.38	-	-	-	-
Comprehension/Recall	9	0.65	0.10	0.36	-	-	-	-
Application	33	0.65	0.10	0.36	2	1.68	0.05	0.55
Data Analysis	6	0.65	0.10	0.40	-	-	-	-

¹For LAL OE items, the mean score is the mean of students' scores on a scale of 0 to 4. Writing is scored on a scale of 0 to 6 for grades 6 through 8. Note that in data analyses and score reporting, WT1 scores were doubled. In mathematics, the constructed-response (CR) items consist of short constructed response (SCR) items scored on a scale from 0 to 1 and extended constructed response (ECR) items scored on a scale from 0 to 3. Science CR items are scored on a scale of 0 to 3.

²Writing Task One

³Writing Task Two

Table 6.1.7: Grade 3 - Difficulty and Discrimination Indices for MC Items by Cluster

Nitem	Median	p-value					Median	Discrimination					
		p < 0.25	<= p < 0.50	<= p < 0.75	<= p < 0.90	p >= 0.90		*pb < 0.20	<= pb < 0.30	<= pb < 0.40	<= pb < 0.50	pb >= 0.50	
		18	0.66	0	0	15	3	0	0.35	0	3	11	4
Working with Text	12	0.64	0	0	9	3	0	0.35	0	2	7	3	0
Analyzing Text	6	0.67	0	0	6	0	0	0.35	0	1	4	1	0
Math	35	0.68	0	3	22	9	1	0.41	1	3	13	17	1
Number and Numerical Operation	11	0.68	0	1	7	3	0	0.41	0	0	5	5	1
Geometry and Measurement	8	0.74	0	0	4	4	0	0.34	0	2	3	3	0
Patterns and Algebra	11	0.58	0	1	7	2	1	0.41	1	1	3	6	0
Data Analysis, Probability, and Discrete Mathematics	5	0.61	0	1	4	0	0	0.42	0	0	2	3	0
<i>Problem Solving</i>	5	0.74	0	0	3	2	0	0.35	0	0	3	2	0
<i>Calculator</i>	8	0.73	0	1	4	3	0	0.41	0	0	4	4	0

* While ideally an item should have a point-biserial correlation of at least 0.20, this item had an acceptable p-value and was retained to preserve adequate content coverage at the cluster level.

Table 6.1.8: Grade 4 - Difficulty and Discrimination Indices for MC Items by Cluster

Nitem	Median	p-Value						Discrimination					
		0.25		0.50		0.75		0.20		0.30		0.40	
		p < 0.25	<= p < 0.50	<= p < 0.75	<= p < 0.90	p >= 0.90	Median	*pb < 0.20	<= pb < 0.30	<= pb < 0.40	<= pb < 0.50	pb >= 0.50	
LAL	24	0.72	0	4	10	9	1	0.36	1	4	11	6	2
Working with Text	14	0.73	0	2	6	5	1	0.36	0	2	9	3	0
Analyzing Text	10	0.70	0	2	4	4	0	0.37	1	2	2	3	2
Math	35	0.68	0	4	22	9	0	0.38	1	3	16	15	0
Number and Numerical Operation	11	0.75	0	0	5	6	0	0.44	0	0	3	8	0
Geometry and Measurement	8	0.61	0	1	7	0	0	0.37	1	0	5	2	0
Patterns and Algebra	8	0.73	0	1	4	3	0	0.36	0	0	6	2	0
Data Analysis, Probability, and Discrete Mathematics	8	0.58	0	2	6	0	0	0.36	0	3	2	3	0
<i>Problem Solving</i>	11	0.70	0	1	7	3	0	0.41	0	1	2	8	0
<i>Calculator</i>	8	0.70	0	2	4	2	0	0.39	0	1	4	3	0
Science	33	0.71	0	5	17	11	0	0.35	2	7	23	1	0
Life Science	14	0.68	0	2	8	4	0	0.36	1	2	10	1	0
Physical Science	9	0.73	0	0	5	4	0	0.36	0	1	8	0	0
Earth Science	10	0.63	0	3	4	3	0	0.32	1	4	5	0	0
<i>Comprehension/Recall</i>	7	0.71	0	1	3	3	0	0.39	0	0	7	0	0
<i>Application</i>	22	0.68	0	4	12	6	0	0.32	2	7	12	1	0
<i>Data Analysis</i>	4	0.69	0	0	2	2	0	0.36	0	0	4	0	0

* While ideally items should have a point-biserial correlation of at least 0.20, these items had acceptable p-values and were retained to preserve adequate content coverage at the cluster level.

Table 6.1.9: Grade 5 - Difficulty and Discrimination Indices for MC Items by Cluster

Nitem	Median	p-value					Median	Discrimination					
		0.25 p < 0.25	0.50 <= p < 0.50	0.75 <= p < 0.75	0.75 <= p < 0.90	p >= 0.90		0.20 *pb < 0.20	0.30 <= pb < 0.30	0.40 <= pb < 0.40	0.40 pb >= 0.50		
		2	22	6	0	0.39		2	0	14	12	2	
LAL	30	0.64	0	2	22	6	0	0.39	2	0	14	12	2
Working with Text	17	0.64	0	2	10	5	0	0.41	2	0	6	7	2
Analyzing Text	13	0.64	0	0	12	1	0	0.36	0	0	8	5	0
Math	33	0.68	0	2	19	12	0	0.44	0	1	12	13	7
Number and Numerical Operation	12	0.73	0	1	5	6	0	0.43	0	0	5	2	5
Geometry and Measurement	11	0.71	0	1	6	4	0	0.44	0	0	5	6	0
Patterns and Algebra	4	0.66	0	0	3	1	0	0.44	0	0	1	3	0
Data Analysis, Probability, and Discrete Mathematics	6	0.65	0	0	5	1	0	0.47	0	1	1	2	2
<i>Problem Solving</i>	12	0.64	0	0	8	4	0	0.46	0	0	4	6	2
<i>Calculator</i>	20	0.66	0	1	11	8	0	0.47	0	0	6	8	6

* While ideally items should have a point-biserial correlation of at least 0.20, these items had acceptable p-values and were retained to preserve adequate content coverage at the cluster level.

Table 6.1.10: Grade 6 - Difficulty and Discrimination Indices for MC Items by Cluster

	Nitem	Median	p-value					Median	Discrimination				
			0.25	0.50	0.75	p >= 0.90	Median		0.20	0.30	0.40		
			p < 0.25	<= p < 0.50	<= p < 0.75				*pb < 0.20	<= pb < 0.30	<= pb < 0.40	<= pb < 0.50	pb >= 0.50
LAL	36	0.69	0	4	24	8	0	0.37	0	8	19	8	1
Working with Text	21	0.71	0	2	12	7	0	0.34	0	6	11	3	1
Analyzing Text	15	0.62	0	2	12	1	0	0.37	0	2	8	5	0
Math	32	0.68	0	4	21	7	0	0.42	0	5	8	17	2
Number and Numerical Operation	10	0.68	0	1	7	2	0	0.41	0	1	2	6	1
Geometry and Measurement	9	0.68	0	1	6	2	0	0.43	0	2	2	4	1
Patterns and Algebra	9	0.70	0	1	5	3	0	0.42	0	2	2	5	0
Data Analysis, Probability, and Discrete Mathematics	4	0.55	0	1	3	0	0	0.39	0	0	2	2	0
<i>Problem Solving</i>	<i>17</i>	<i>0.55</i>	<i>0</i>	<i>4</i>	<i>12</i>	<i>1</i>	<i>0</i>	<i>0.40</i>	<i>0</i>	<i>2</i>	<i>6</i>	<i>9</i>	<i>0</i>
<i>Calculator</i>	<i>20</i>	<i>0.68</i>	<i>0</i>	<i>2</i>	<i>15</i>	<i>3</i>	<i>0</i>	<i>0.43</i>	<i>0</i>	<i>2</i>	<i>5</i>	<i>12</i>	<i>1</i>

Table 6.1.11: Grade 7 - Difficulty and Discrimination Indices for MC Items by Cluster

	Nitem	Median	p-value					Median	Discrimination				
			0.25	0.50	0.75	p >= 0.90	Median		0.20	0.30	0.40		
			p < 0.25	<= p < 0.50	<= p < 0.75				*pb < 0.20	<= pb < 0.30	<= pb < 0.40	<= pb < 0.50	pb >= 0.50
LAL	36	0.65	0	5	26	5	0	0.36	1	8	16	10	1
Working with Text	20	0.65	0	1	19	0	0	0.36	1	4	9	5	1
Analyzing Text	16	0.63	0	4	7	5	0	0.34	0	4	7	5	0
Math	32	0.59	0	7	21	4	0	0.39	0	2	16	8	6
Number and Numerical Operation	8	0.58	0	1	7	0	0	0.45	0	0	3	1	4
Geometry and Measurement	9	0.60	0	1	6	2	0	0.38	0	0	6	3	0
Patterns and Algebra	9	0.64	0	3	5	1	0	0.39	0	1	4	3	1
Data Analysis, Probability, and Discrete Mathematics	6	0.56	0	2	3	1	0	0.33	0	1	3	1	1
<i>Problem Solving</i>	<i>16</i>	<i>0.53</i>	<i>0</i>	<i>7</i>	<i>7</i>	<i>2</i>	<i>0</i>	<i>0.40</i>	<i>0</i>	<i>1</i>	<i>7</i>	<i>4</i>	<i>4</i>
<i>Calculator</i>	<i>20</i>	<i>0.59</i>	<i>0</i>	<i>4</i>	<i>13</i>	<i>3</i>	<i>0</i>	<i>0.39</i>	<i>0</i>	<i>2</i>	<i>10</i>	<i>4</i>	<i>4</i>

* While ideally an item should have a point-biserial correlation of at least .20, this item had an acceptable p-value and was retained to preserve adequate content coverage at the cluster level.

Table 6.1.12: Grade 8 - Difficulty and Discrimination Indices for MC Items by Cluster

Nitem	Median	p-Value						Discrimination					
		0.25		0.50		0.75		0.20		0.30		0.40	
		p < 0.25	<= p < 0.50	<= p < 0.75	<= p < 0.90	p >= 0.90	Median	*pb < 0.20	<= pb < 0.30	<= pb < 0.40	<= pb < 0.50	pb >= 0.50	
LAL	36	0.70	0	1	24	11	0	0.42	0	2	10	20	4
Working with Text	23	0.70	0	1	15	7	0	0.43	0	1	4	15	3
Analyzing Text	13	0.70	0	0	9	4	0	0.39	0	1	6	5	1
Math	32	0.64	0	10	16	6	0	0.42	0	2	12	16	2
Number and Numerical Operation	8	0.50	0	5	3	0	0	0.46	0	0	2	5	1
Geometry and Measurement	9	0.67	0	1	5	3	0	0.39	0	1	4	4	0
Patterns and Algebra	9	0.68	0	2	5	2	0	0.43	0	1	3	4	1
Data Analysis, Probability, and Discrete Mathematics	6	0.63	0	2	3	1	0	0.38	0	0	3	3	0
<i>Problem Solving</i>	<i>21</i>	<i>0.59</i>	<i>0</i>	<i>8</i>	<i>8</i>	<i>5</i>	<i>0</i>	<i>0.43</i>	<i>0</i>	<i>2</i>	<i>7</i>	<i>11</i>	<i>1</i>
<i>Calculator</i>	<i>20</i>	<i>0.62</i>	<i>0</i>	<i>7</i>	<i>9</i>	<i>4</i>	<i>0</i>	<i>0.43</i>	<i>0</i>	<i>0</i>	<i>6</i>	<i>12</i>	<i>2</i>
Science	48	0.66	0	5	36	7	0	0.37	1	9	25	12	1
Life Science	19	0.65	0	3	15	1	0	0.37	1	1	11	6	0
Physical Science	17	0.65	0	2	12	3	0	0.36	0	5	10	2	0
Earth Science	12	0.71	0	0	9	3	0	0.40	0	3	4	4	1
<i>Comprehension/Recall</i>	<i>9</i>	<i>0.69</i>	<i>0</i>	<i>0</i>	<i>7</i>	<i>2</i>	<i>0</i>	<i>0.38</i>	<i>0</i>	<i>2</i>	<i>4</i>	<i>3</i>	<i>0</i>
<i>Application</i>	<i>33</i>	<i>0.66</i>	<i>0</i>	<i>4</i>	<i>24</i>	<i>5</i>	<i>0</i>	<i>0.36</i>	<i>1</i>	<i>6</i>	<i>18</i>	<i>8</i>	<i>0</i>
<i>Data Analysis</i>	<i>6</i>	<i>0.67</i>	<i>0</i>	<i>1</i>	<i>5</i>	<i>0</i>	<i>0</i>	<i>0.39</i>	<i>0</i>	<i>1</i>	<i>3</i>	<i>1</i>	<i>1</i>

* While ideally an item should have a point-biserial correlation of at least .20, this item had an acceptable p-value and was retained to preserve adequate content coverage at the cluster level.

Table 6.1.13: Number of Multiple-Choice Items Flagged by Distractor Analyses

Test	Grade	N-item	p-value*	Point-Biserial*
LAL	3	18	0	0
	4	24	1	0
	5	30	0	0
	6	36	0	0
	7	36	3	0
	8	36	0	0
Math	3	35	0	0
	4	35	1	0
	5	33	0	0
	6	32	1	0
	7	32	2	0
	8	32	2	0
Science	4	33	0	0
	8	48	0	0

* The p-value and point-biserial correlation in this table are calculated in the same way as for a correct answer, except in this case the distractor is used instead of the correct answer.

6.2 Speededness

The consequence of time limits on examinee's scores is called speededness. An examination is "speeded" to the degree that those taking the exam score lower than they would have had the test not been timed. Most speededness statistics are based on the number of items that were not attempted by students. In each separately timed subsection of a test, if a student does not attempt the last item of the test, it can be assumed that the student may have run out of time before reaching the last item. The percentage of students omitting an item provides information about speededness, although it must be kept in mind that students can omit an item for reasons other than speededness (for example, choosing to not put effort into answering a constructed response item). Thus, if the percentage of omits is low, that implies that there is little speededness; if a percentage of omits is high, speededness, as well as other factors, may be the cause.

The NJ ASK was not designed to be a speeded test, but rather a power test. That is, all students are expected to have ample time to finish all items and prompts. As the tests were administered over four days, with multiple sessions each day, students were assumed to have enough time to complete the test. The number of items and item types composing each test, along with the testing time and day of administration are detailed in Table 6.2.1. Table 6.2.2 presents the percentage of students omitting the last MC item in each test section.

Table 6.2.1: Testing Schedule – Items and Time Allocations

Subject	Grade	Day 1		Day 2	
		Items	Time*	Items	Time*
LAL	3	1WT, 12 MC 2 OE	90	1WT, 6 MC 1 OE	90
	4	1WT, 16 MC 2 OE	90	1WT, 8 MC 1 OE	90
	5	1WT, 20 MC 2 OE	90	1WT, 10 MC 1 OE	90
	6	1WT, 18 MC 2 OE	105	1WT, 18 MC 2 OE	120-135
	7	1WT, 18 MC 2 OE	105	1WT, 18 MC 2 OE	120-135
	8	1WT, 18 MC 2 OE	105	1WT, 18 MC 2 OE	120-135
Day 3					
Math	3	6SCR, 19 MC, 1ECR	63	16 MC, 2 ECR	68
	4	6SCR, 19 MC, 1ECR	63	16 MC, 2 ECR	68
	5	8SCR, 13 MC, 1ECR	68	20 MC, 2 ECR	68
	6	8SCR, 12 MC, 1ECR	64	20 MC, 2 ECR	69
	7	8SCR, 12 MC, 1ECR	64	20 MC, 2 ECR	69
	8	8SCR, 32 MC, 3ECR	133		
Day 4					
Science	4	33 MC, 2 CR	60		
	8	48 MC, 2 CR	120		
Day 5					
Science	4	33 MC, 2 CR	60		
	8	48 MC, 2 CR	120		

* Time in minutes

Table 6.2.2: Percent of Students Omitting the Last MC Item in Each Test Section

Grade	Section	Content Area	Location	%
3	1	LAL	N/A	N/A
	2		Item 6	0.79
	3		Item 13	0.80
	4		N/A	N/A
	5		Item 20	0.79
	1	Math	N/A	N/A
	2		Item 19	0.70
	3		Item 27	0.35
	4		Item 36	0.36
	5		Item 45	0.59

Grade	Section	Content Area	Location	%
4	1	LAL	N/A	N/A
	2		Item 8	0.37
	3		Item 17	0.82
	4		N/A	N/A
	5		Item 26	0.46
	1	Math	N/A	N/A
	2		Item 19	0.77
	3		Item 27	0.56
	4		Item 36	0.66
	5		Item 45	0.34
	1	Science	Item 13	0.55
	2		Item 23	0.77
	3		Item 34	0.48
5	1	LAL	N/A	N/A
	2		Item 10	0.96
	3		Item 21	0.52
	4		N/A	N/A
	5		Item 32	0.61
	1	Math	N/A	N/A
	2		Item 23	1.05
	3		Item 40	0.70
	4		Item 51	0.91
6	1	LAL	Item 9	0.85
	2		Item 19	0.34
	3		N/A	N/A
	4		N/A	N/A
	5		Item 29	0.32
	6		Item 39	0.41
	1	Math	N/A	N/A
	2		Item 18	0.85
	3		Item 23	0.56
	4		Item 38	0.58
	5		Item 49	0.57

Grade	Section	Content Area	Location	%
7	1	LAL	Item 9	0.68
	2		Item 19	0.39
	3		N/A	N/A
	4		N/A	N/A
	5		Item 29	0.30
	6		Item 39	0.33
8	1	Math	N/A	N/A
	2		Item 18	1.93
	3		Item 23	0.96
	4		Item 38	0.55
	5		Item 49	0.53
8	1	LAL	Item 9	0.47
	2		Item 19	0.29
	3		N/A	N/A
	4		N/A	N/A
	5		Item 29	0.31
	6		Item 39	0.33
8	1	Math	N/A	N/A
	2		Item 18	1.05
	3		Item 23	0.29
	4		Item 38	0.72
	5		Item 49	0.40
8	1	Science	Item 18	0.10
	2		Item 33	0.26
	3		Item 49	0.17

6.3 Intercorrelations

The Pearson product-moment correlations between the content areas and test sections/clusters are presented in Tables 6.3.1–6.3.6. Generally, the more items a cluster (standard) has, the higher the correlation with the total score. After all, the cluster (standard) makes up more of the points of the total score. For example, the Reading total score at grade 3 is highly correlated with the LAL score (0.95) because the Reading score makes up 30 of the 50 possible points for LAL. In mathematics at grade 4, the correlation between the Math 5 and the total mathematics score is 0.95. This is due in part to the fact that Math 5 consists of the items identified as Problem Solving. These items account for 20 of the 50 possible total points for mathematics.

These tables illustrate, as expected, a higher correlation between clusters within content areas than clusters from different content areas. For example, at grade 3, the correlation between the Writing items (WT1 and WT2) and the Reading items (LAL1 and LAL2) is 0.61. The correlations between Writing items and the mathematics clusters (Math 1 – 5) ranged from 0.48 to 0.54.

Table 6.3.1: Grade 3 Correlation Coefficients among Content Domains and Clusters

	LAL	Writing WT1	WT2	Reading	LAL1	LAL 2	Math	Math 1	Math 2	Math 3	Math 4	Math 5	Math 6
LAL	1.00												
Writing	0.83	1.00											
*WT1	0.73	0.89	1.00										
(WT2)	0.76	0.90	0.60	1.00									
Reading	0.95	0.61	0.53	0.57	1.00								
LAL1	0.86	0.53	0.45	0.49	0.93	1.00							
LAL2	0.90	0.62	0.53	0.57	0.93	0.72	1.00						
Math	0.75	0.58	0.49	0.54	0.73	0.67	0.69	1.00					
Math 1	0.70	0.54	0.46	0.50	0.69	0.64	0.65	0.95	1.00				
Math 2	0.65	0.52	0.45	0.48	0.63	0.57	0.60	0.85	0.73	1.00			
Math 3	0.63	0.49	0.41	0.45	0.62	0.57	0.58	0.86	0.75	0.66	1.00		
Math 4	0.64	0.48	0.41	0.45	0.63	0.58	0.60	0.85	0.74	0.66	0.66	1.00	
Math 5	0.68	0.53	0.46	0.49	0.67	0.61	0.64	0.91	0.85	0.81	0.70	0.83	1.00
Math 6	0.66	0.51	0.44	0.48	0.65	0.59	0.61	0.89	0.79	0.72	0.79	0.88	0.83
													1.00

*WT1 = Writing Prompt One, WT2 = Writing Prompt Two, LAL1 = Working with Text, LAL2 = Analyzing Text, Math 1 = Number & Numerical Operations, Math 2 = Geometry & Measurement, Math 3 = Patterns & Algebra, Math 4 = Data Analysis, Probability, & Discrete Mathematics, Math 5 = Problem Solving, Math 6 = Calculator

Table 6.3.2: Grade 4 Correlation Coefficients among Content Domains and Clusters

	LAL	Writing	WT1	WT2	Reading	LAL1	LAL 2	Math	Math 1	Math 2	Math 3	Math 4	Math 5	Math 6	Science	Life	Physical	Earth	Comp.	Application	Data Anal.
LAL	1.00																				
Writing	0.82	1.00																			
*WT1	0.71	0.90	1.00																		
(WT2)	0.77	0.90	0.62	1.00																	
Reading	0.96	0.63	0.52	0.60	1.00																
LAL1	0.88	0.56	0.46	0.54	0.92	1.00															
LAL2	0.92	0.62	0.52	0.59	0.96	0.77	1.00														
Math	0.75	0.57	0.48	0.55	0.74	0.69	0.71	1.00													
Math 1	0.72	0.56	0.48	0.54	0.71	0.65	0.68	0.94	1.00												
Math 2	0.60	0.44	0.37	0.43	0.60	0.57	0.57	0.85	0.70	1.00											
Math 3	0.66	0.50	0.42	0.48	0.65	0.61	0.62	0.88	0.76	0.67	1.00										
Math 4	0.61	0.46	0.39	0.44	0.60	0.56	0.57	0.81	0.68	0.62	0.65	1.00									
Math 5	0.71	0.54	0.45	0.52	0.70	0.65	0.67	0.95	0.87	0.82	0.83	0.80	1.00								
Math 6	0.67	0.51	0.43	0.49	0.66	0.62	0.63	0.88	0.84	0.67	0.81	0.73	0.88	1.00							
Science	0.79	0.55	0.46	0.53	0.81	0.76	0.76	0.76	0.72	0.63	0.67	0.62	0.72	0.68	1.00						
Life	0.73	0.51	0.42	0.50	0.75	0.70	0.71	0.69	0.66	0.57	0.61	0.56	0.65	0.62	0.92	1.00					
Physical	0.71	0.50	0.42	0.48	0.72	0.68	0.69	0.70	0.66	0.58	0.62	0.56	0.66	0.63	0.89	0.71	1.00				
Earth	0.65	0.45	0.37	0.43	0.67	0.63	0.63	0.62	0.59	0.52	0.55	0.51	0.59	0.56	0.85	0.67	0.65	1.00			
Comp.	0.66	0.44	0.36	0.43	0.68	0.64	0.64	0.63	0.60	0.52	0.55	0.51	0.59	0.56	0.83	0.76	0.73	0.70	1.00		
Application	0.77	0.54	0.45	0.52	0.78	0.73	0.74	0.74	0.70	0.61	0.65	0.60	0.69	0.66	0.98	0.89	0.86	0.84	0.72	1.00	
Data Anal.	0.58	0.41	0.34	0.39	0.59	0.55	0.56	0.57	0.54	0.47	0.50	0.46	0.54	0.51	0.71	0.68	0.64	0.56	0.54	0.61	1.00

*WT1 = Writing Prompt One, WT2 = Writing Prompt Two, LAL1 = Working with Text, LAL2 = Analyzing Text, Math 1 = Number & Numerical Operations, Math 2 = Geometry & Measurement, Math 3 = Patterns & Algebra, Math 4 = Data Analysis, Probability, & Discrete Mathematics, Math 5 = Problem Solving, Math 6 = Calculator

Table 6.3.3: Grade 5 Correlation Coefficients among Content Domains and Clusters

	LAL	Writing WT1	WT2	Reading	LAL1	LAL 2	Math	Math 1	Math 2	Math 3	Math 4	Math 5	Math 6
LAL	1.00												
Writing	0.81	1.00											
*WT1	0.72	0.90	1.00										
(WT2)	0.72	0.89	0.60	1.00									
Reading	0.97	0.65	0.58	0.58	1.00								
LAL1	0.91	0.59	0.53	0.53	0.95	1.00							
LAL2	0.93	0.63	0.56	0.57	0.95	0.80	1.00						
Math	0.76	0.61	0.54	0.55	0.75	0.71	0.71	1.00					
Math 1	0.72	0.57	0.50	0.51	0.70	0.66	0.67	0.94	1.00				
Math 2	0.71	0.55	0.49	0.50	0.70	0.66	0.66	0.92	0.81	1.00			
Math 3	0.62	0.51	0.45	0.46	0.60	0.56	0.57	0.82	0.72	0.69	1.00		
Math 4	0.67	0.53	0.47	0.47	0.65	0.62	0.62	0.85	0.75	0.73	0.64	1.00	
Math 5	0.72	0.58	0.51	0.52	0.70	0.66	0.67	0.96	0.90	0.87	0.82	0.82	1.00
Math 6	0.74	0.59	0.52	0.53	0.72	0.68	0.69	0.97	0.90	0.90	0.83	0.80	0.95
													1.00

*WT1 = Speculative Writing Prompt, WT2 = Expository Writing Prompt, LAL1 = Working with Text, LAL2 = Analyzing Text, Math 1 = Number & Numerical Operations, Math 2 = Geometry & Measurement, Math 3 = Patterns & Algebra, Math 4 = Data Analysis, Probability, & Discrete Mathematics, Math 5 = Problem Solving, Math 6 = Problem Sovling

Table 6.3.4: Grade 6 Correlation Coefficients among Content Domains and Clusters

	LAL	Writing WT1	WT2	Reading	LAL1	LAL 2	Math	Math 1	Math 2	Math 3	Math 4	Math 5	Math 6
LAL	1.00												
Writing	0.82	1.00											
*WT1	0.76	0.96	1.00										
(WT2)	0.75	0.85	0.68	1.00									
Reading	0.98	0.70	0.64	0.67	1.00								
LAL1	0.92	0.63	0.58	0.60	0.94	1.00							
LAL2	0.95	0.70	0.64	0.66	0.96	0.82	1.00						
Math	0.77	0.64	0.59	0.59	0.75	0.71	0.72	1.00					
Math 1	0.68	0.57	0.52	0.52	0.66	0.62	0.64	0.90	1.00				
Math 2	0.69	0.58	0.54	0.54	0.67	0.63	0.65	0.91	0.76	1.00			
Math 3	0.71	0.58	0.54	0.54	0.70	0.66	0.67	0.91	0.76	0.75	1.00		
Math 4	0.67	0.56	0.52	0.52	0.66	0.62	0.63	0.86	0.71	0.72	0.73	1.00	
Math 5	0.74	0.61	0.56	0.56	0.72	0.68	0.70	0.97	0.88	0.87	0.88	0.86	1.00
Math 6	0.74	0.62	0.57	0.57	0.73	0.69	0.70	0.97	0.85	0.91	0.84	0.87	0.96
													1.00

*WT1 = Persuasive Writing Prompt, WT2 = Speculative Writing Prompt, LAL1 = Working with Text, LAL2 = Analyzing Text, Math 1 = Number & Numerical Operations, Math 2 = Geometry & Measurement, Math 3 = Patterns & Algebra, Math 4 = Data Analysis, Probability, & Discrete Mathematics, Math 5 = Problem Solving, Math 6 = Calculator

Table 6.3.5: Grade 7 Correlation Coefficients among Content Domains and Clusters

	LAL	Writing WT1	WT2	Reading	LAL1	LAL 2	Math	Math 1	Math 2	Math 3	Math 4	Math 5	Math 6
LAL	1.00												
Writing	0.81	1.00											
*WT1	0.77	0.97	1.00										
(WT2)	0.71	0.83	0.65	1.00									
Reading	0.98	0.69	0.64	0.62	1.00								
LAL1	0.91	0.60	0.56	0.55	0.94	1.00							
LAL2	0.95	0.70	0.65	0.63	0.96	0.81	1.00						
Math	0.77	0.60	0.56	0.53	0.77	0.71	0.75	1.00					
Math 1	0.69	0.53	0.50	0.47	0.69	0.65	0.67	0.93	1.00				
Math 2	0.71	0.55	0.52	0.49	0.71	0.65	0.69	0.92	0.80	1.00			
Math 3	0.73	0.57	0.53	0.50	0.73	0.68	0.71	0.92	0.80	0.79	1.00		
Math 4	0.66	0.52	0.49	0.46	0.65	0.60	0.63	0.83	0.70	0.71	0.71	1.00	
Math 5	0.75	0.57	0.53	0.51	0.75	0.70	0.72	0.97	0.90	0.88	0.91	0.81	1.00
Math 6	0.76	0.58	0.54	0.51	0.75	0.70	0.73	0.97	0.90	0.87	0.92	0.80	0.96
													1.00

*WT1 = Persuasive Writing Prompt, WT2 = Speculative Writing Prompt, LAL1 = Working with Text, LAL2 = Analyzing Text, Math 1 = Number & Numerical Operations, Math 2 = Geometry & Measurement, Math 3 = Patterns & Algebra, Math 4 = Data Analysis, Probability, & Discrete Mathematics, Math 5 =Problem Solving, Math 6 = Calculator

Table 6.3.6: Grade 8 Correlation Coefficients among Content Domains and Clusters

	LAL	Writing	WT1	WT2	Reading	LAL1	LAL2	Math	Math 1	Math 2	Math 3	Math 4	Math 5	Math 6	Science	Life	Physical	Earth	Comp.	Application	Data Anal.
LAL	1.00																				
Writing	0.83	1.00																			
*WT1	0.80	0.97	1.00																		
(WT2)	0.74	0.85	0.70	1.00																	
Reading	0.99	0.74	0.70	0.66	1.00																
LAL1	0.94	0.66	0.63	0.59	0.96	1.00															
LAL2	0.95	0.76	0.72	0.68	0.95	0.83	1.00														
Math	0.77	0.62	0.59	0.54	0.77	0.73	0.73	1.00													
Math 1	0.69	0.54	0.52	0.48	0.69	0.66	0.66	0.92	1.00												
Math 2	0.71	0.58	0.55	0.51	0.71	0.67	0.68	0.92	0.79	1.00											
Math 3	0.72	0.58	0.56	0.51	0.72	0.69	0.69	0.91	0.78	0.78	1.00										
Math 4	0.65	0.53	0.51	0.46	0.65	0.61	0.62	0.85	0.72	0.72	0.72	1.00									
Math 5	0.75	0.60	0.57	0.53	0.75	0.72	0.72	0.98	0.92	0.90	0.91	0.81	1.00								
Math 6	0.74	0.60	0.57	0.53	0.74	0.71	0.71	0.97	0.92	0.89	0.86	0.82	0.96	1.00							
Science	0.81	0.62	0.59	0.56	0.81	0.79	0.76	0.80	0.73	0.75	0.74	0.66	0.79	0.77	1.00						
Life	0.78	0.60	0.57	0.54	0.79	0.76	0.74	0.77	0.71	0.72	0.71	0.64	0.77	0.75	0.95	1.00					
Physical	0.71	0.55	0.52	0.49	0.71	0.69	0.67	0.72	0.66	0.67	0.66	0.59	0.71	0.69	0.91	0.78	1.00				
Earth	0.71	0.55	0.52	0.48	0.72	0.70	0.67	0.68	0.62	0.64	0.63	0.57	0.67	0.66	0.87	0.76	0.72	1.00			
Comp.	0.66	0.50	0.48	0.45	0.67	0.65	0.62	0.66	0.61	0.62	0.61	0.54	0.65	0.64	0.84	0.77	0.79	0.76	1.00		
Application	0.80	0.62	0.59	0.56	0.81	0.78	0.76	0.78	0.71	0.73	0.72	0.65	0.77	0.76	0.98	0.94	0.88	0.86	0.76	1.00	
Data Anal.	0.64	0.49	0.46	0.43	0.65	0.63	0.61	0.67	0.62	0.63	0.62	0.55	0.67	0.65	0.80	0.76	0.73	0.68	0.62	0.72	1.00

*WT1 = Persuasive Writing Prompt, WT2 = Speculative Writing Prompt, LAL1 = Working with Text, LAL2 = Analyzing Text, Math 1 = Number & Numerical Operations, Math 2 = Geometry & Measurement, Math 3 = Patterns & Algebra, Math 4 = Data Analysis, Probability, & Discrete Mathematics, Math 5 = Problem Solving, Math 6 = Calculator

6.4 DIF Analysis

Using data from the field test items embedded in the 2011 operational tests, Differential Item Functioning (DIF) was examined using the Mantel-Haenszel (1959)²⁴ procedure for the MC items and CR items. As all items must be field tested and scrutinized including DIF analyses prior to appearing as an operational item, DIF analyses are not conducted on operational items.

For DIF analyses, all members of the reference group (typically male/majority) are compared against all members of the focal group (typically female/minority). The DIF analyses conducted for NJ ASK 3–8 focused on gender and ethnicity. The number of examinees composing the reference and focal groups differ dependent upon the year in which a given item was field tested. In general, appropriately 4,500 examinees respond to each field test item. The proportion of examinees involved in the DIF analyses are quite similar to the proportions that can be derived from the Performance by Demographic Groups reports found at <http://www.nj.gov/education/schools/achievement/2011/>.

The Mantel-Haenszel (MH) method is a non-parametric approach to DIF. In the MH procedure, total raw scores are held constant while the odds ratio is estimated. The ETS categorization is applied to flag the significance of DIF effects (Dorans & Holland, 1993)²⁵. DIF analyses are detailed in Section 2.2 - Development of Test Items. The letters A, B, and C are used to denote the ETS categorizations. A indicates a smaller degree of DIF, B indicates moderated DIF, and C indicates larger differences in the performance of the reference and focal groups on a given item. Slightly different categorizations were used for the constructed response items. A or NS indicates a smaller degree of DIF, B or S indicates moderated DIF, and C- indicates larger differences. Table 6.4.1 represents the ETS categorization of each of the items used in the 2011 NJ ASK operational test when they were field tested.

²⁴ Mantel, N. & Haenszel, W. (1959). Statistical aspects of the analysis of data from retrospective studies of disease. *Journal of National Cancer Institute*, 22, 719-748.

²⁵ Dorans, N. J. & Holland, P. W. (1993). DIF detection and description: Mantel-Haenszel and standardization. In P. W. Holland & H. Wainer (Eds.), *Differential item functioning* (pp. 35-66). Hillsdale, NJ: Lawrence Erlbaum.

Table 6.4.1: 2011 NJ ASK Operational Items - DIF Categories by Item Type and Grade

Test	Grade	Group	Multiple Choice*			Constructed-Response*		
			A**	B**	C**	A/NS ⁺	B/S ⁺	C- ⁺
LAL	3	M/F***	16	2	0	1	3	0
		W/B***	16	2	0	3	1	0
		W/H***	16	2	0	2	2	0
	4	M/F	20	4	0	3	1	0
		W/B	23	1	0	2	2	0
		W/H	19	5	0	0	4	0
	5	M/F	29	1	0	4	1	0
		W/B	28	2	0	2	3	0
		W/H	29	1	0	4	1	0
	6	M/F	31	4	1	0	6	0
		W/B	30	6	0	4	2	0
		W/H	32	4	0	3	3	0
	7	M/F	29	7	0	2	4	0
		W/B	29	7	0	3	3	0
		W/H	26	10	0	4	2	0
	8	M/F	26	10	0	4	2	0
		W/B	31	5	0	0	6	0
		W/H	30	6	0	2	4	0
Math	3	M/F	32	2	1	6	3	0
		W/B	33	2	0	7	2	0
		W/H	30	5	0	6	3	0
	4	M/F	33	2	0	9	0	0
		W/B	31	4	0	8	1	0
		W/H	33	2	0	7	2	0
	5	M/F	29	4	0	9	2	0
		W/B	26	7	0	9	2	0
		W/H	27	6	0	8	3	0
	6	M/F	27	5	0	8	3	0
		W/B	31	1	0	9	2	0
		W/H	28	4	0	8	3	0
	7	M/F	29	3	0	9	2	0
		W/B	30	2	0	11	0	0
		W/H	28	4	0	8	3	0
	8	M/F	15	8	0	10	1	0
		W/B	21	2	0	10	1	0
		W/H	20	3	0	9	2	0
Science	4	M/F	30	3	0	2	0	0
		W/B	31	1	1	1	1	0
		W/H	23	10	0	2	0	0
	8	M/F	18	7	0	1	1	0
		W/B	22	3	0	0	2	0
		W/H	18	7	0	0	2	0

* The Mantel-Haenszel procedure is applied for the MC and CR items.

** DIF categories for MC items: A, negligible; B, slight to moderate; and C, moderate to severe.

*** DIF contrast groups: M/F, Male versus Female; W/B, White versus Black; and W/H, White versus Hispanic.

+ DIF categories for CR items: A/NS, negligible; B/S, moderate to severe; and C-, severe.

6.5 Summary Statistics

Descriptive Statistics for Total Raw Score

Descriptive statistics of total scores for NJ ASK 2011 are summarized in Table 6.5.1 by test content, form, and grade level. A total of 617,465 students participated in the LAL grades 3–8 tests, 617,069 students participated in the mathematics grades 3–8 tests, and 206,030 students participated in the science tests in grades 4 and 8 test.

Table 6.5.1: Descriptive Statistics for Total Raw Score by Content Area and Grade Level

Test	Grade	Form	N	Mean	STD	Min	Max	Nitem	Max Possible
LAL	3	OP	101022	26.03	7.32	0	46	23	50
	4	OP	102506	32.70	8.97	0	53	29	56
	5	OP	102922	34.20	9.91	0	58	35	62
	6	OP	103788	41.16	11.15	0	68	42	70
	7	OP	103743	40.59	11.17	0	67	42	70
	8	OP	103484	44.30	11.90	0	69	42	70
	3	AL	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	4	AL	24	26.54	7.15	10	42	29	56
	5	AL	12	29.83	7.27	20	40	35	62
	6	AL	1	52.00	-	52	52	42	70
	7	AL	15	34.80	4.87	26	46	42	70
	8	AL	12	17.75	5.05	11	29	42	70
	3	BR	4	28.75	6.55	23	37	23	50
	4	BR	6	33.33	6.19	26	44	29	56
	5	BR	6	34.00	8.29	23	43	35	62
	6	BR	10	37.80	13.55	17	57	42	70
	7	BR	5	29.40	19.55	2	55	42	70
	8	BR	7	41.00	11.17	26	57	42	70
	3	LP	113	22.15	7.86	0	36	23	50
	4	LP	143	26.54	10.27	0	47	29	56
	5	LP	107	26.61	11.12	0	52	35	62
	6	LP	97	33.00	12.69	0	55	42	70
	7	LP	105	32.80	12.69	0	60	42	70
	8	LP	93	37.41	14.09	0	61	42	70
	3	SP	700	19.81	7.41	0	43	23	50
	4	SP	659	24.69	7.83	0	44	29	56
	5	SP	712	23.74	7.12	0	44	35	62
	6	SP	792	30.35	9.91	0	54	41	69
	7	SP	910	26.88	8.63	0	60	42	70
	8	SP	910	30.56	10.06	0	58	42	70

Table 6.5.1: Descriptive Statistics for Total Raw Score by Content Area and Grade Level (con't)

Test	Grade	Form	N	Mean	STD	Min	Max	Nitem	Max Possible
Math	3	OP	101014	32.33	10.82	0	50	44	50
	4	OP	102501	32.05	10.51	0	50	44	50
	5	OP	102933	32.34	11.11	0	50	44	50
	6	OP	103696	30.24	11.08	0	49	43	49
	7	OP	103570	28.63	11.53	0	49	43	49
	8	OP	103355	27.45	11.23	0	49	43	49
	3	AL	10	32.90	9.62	16	46	44	50
	4	AL	32	23.94	8.83	4	41	44	50
	5	AL	3	21.33	7.64	13	28	43	47
	6	AL	93	27.13	10.25	8	48	43	49
	7	AL	188	24.64	11.58	4	49	43	49
	8	AL	142	26.55	12.47	4	49	43	49
	3	BR	4	35.00	11.89	19	45	42	46
	4	BR	6	30.33	11.00	15	45	42	46
	5	BR	6	24.00	7.56	15	34	43	47
	6	BR	10	21.80	8.57	11	35	38	42
	7	BR	5	16.40	16.09	2	42	42	46
	8	BR	7	20.29	10.58	4	33	41	45
	3	LP	113	27.89	10.75	0	48	44	50
	4	LP	142	27.55	11.31	0	48	44	50
	5	LP	107	25.39	12.44	0	49	44	50
	6	LP	97	24.10	11.87	0	46	43	49
	7	LP	105	20.87	10.71	0	48	43	49
	8	LP	93	21.04	11.33	0	45	43	49
	3	SP	698	19.16	9.62	0	48	44	50
	4	SP	657	18.87	9.24	0	46	44	50
	5	SP	710	17.59	8.74	0	45	44	50
	6	SP	792	15.44	8.47	0	46	43	49
	7	SP	910	14.24	7.47	0	45	43	49
	8	SP	909	13.22	6.44	0	41	42	46
Science	4	OP	102533	24.97	7.24	0	39	35	39
	8	OP	103497	34.23	10.82	0	54	50	54
	4	AL	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	8	AL	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	4	BR	6	19.50	8.34	11	30	32	36
	8	BR	7	29.29	11.04	14	45	49	53
	4	LP	142	22.25	7.36	5	36	35	39
	8	LP	93	30.28	11.22	0	53	50	54
	4	SP	657	15.67	6.21	0	34	35	39
	8	SP	909	21.02	6.60	0	47	50	54

*OP: Operational Test; AL: Alternative Operational Test; BR: Braille; LP: Large Print; SP: Spanish Version.

Descriptive Statistics for Total Raw Score by Cluster

Tables 6.5.2 through 6.5.7 summarize the means and standard deviations for raw score attained by cluster for the 2011 NJ ASK operational test forms.

Table 6.5.2: Grade 3 Means and Standard Deviations for Raw Score

	Number of Items			Number of Possible Points	Raw Score		Mean % of Points Available
	MC	CR	SCR		Mean	Standard Deviation	
LAL	18	5		50	25.99	7.34	51.97%
Writing		2		20	10.04	2.92	50.20%
Reading	18	3		30	15.94	5.17	53.14%
Working with Text	12	-		12	7.73	2.81	64.44%
Analyzing Text	6	3		18	8.21	2.76	45.60%
Math	35	3	6	50	32.24	10.87	64.48%
Number & Numerical Operations	11	1	6	20	13.12	4.78	65.59%
Geometry & Measurement	8	1	0	11	7.29	2.57	66.25%
Patterns & Algebra	11	0	0	11	7.08	2.55	64.33%
Data Analysis, Probability, & Discrete Mathematics	5	1		8	4.76	2.31	59.46%
<i>Problem Solving</i>	5	3	0	14	8.88	3.64	63.40%
<i>Calculator</i>	8	1	0	11	7.10	2.90	64.56%

Table 6.5.3: Grade 4 Means and Standard Deviations for Raw Score

	Number of Items			Number of Possible Points	Raw Score		Mean % of Points Available
	MC	CR	SCR		Mean	Standard Deviation	
LAL	24	5		56	32.64	8.99	58.28%
Writing		2		20	11.62	3.32	58.10%
Reading	24	3		36	21.02	6.54	58.38%
Working with Text	14			14	9.39	3.04	67.05%
Analyzing Text	10	3		22	11.63	3.91	52.87%
Math	35	3	6	50	31.95	10.56	63.91%
Number & Numerical Operations	11	1	6	20	14.28	4.66	71.38%
Geometry & Measurement	8	1	0	11	6.04	2.66	54.94%
Patterns & Algebra	8	1	0	11	7.07	2.65	64.31%
Data Analysis, Probability, & Discrete Mathematics	8	0	0	8	4.56	1.99	57.02%
<i>Problem Solving</i>	11	3	0	20	12.06	4.87	60.28%
<i>Calculator</i>	8	1	0	11	7.14	2.77	64.89%
Science	33	2		39	24.91	7.27	63.87%
Life Science	13	1		16	10.37	3.25	64.79%
Physical Science	9	1		12	7.59	2.61	63.26%
Earth Science	11	0		11	6.95	2.33	63.19%
<i>Comprehension/Recall</i>	7	0		7	4.95	1.72	70.71%
<i>Application</i>	22	2		28	17.16	5.20	61.30%
<i>Data Analysis</i>	4	0		4	2.79	1.10	69.84%

Table 6.5.4: Grade 5 Means and Standard Deviations for Raw Score

	Number of Items			Number of Possible Points	Raw Score		Mean % of Points Available
	MC	CR	SCR		Mean	Standard Deviation	
LAL	30	5		62	34.12	9.93	55.03%
Writing		2		20	11.31	3.07	56.57%
Reading	30	3		42	22.81	7.67	54.30%
Working with Text	17			17	10.96	3.91	64.49%
Analyzing Text	13	3		25	11.84	4.17	47.38%
Math	33	3	8	50	32.23	11.17	64.47%
Number & Numerical Operations	12	1	3	18	11.92	4.36	66.25%
Geometry & Measurement	11	1	2	16	9.53	3.80	59.56%
Patterns & Algebra	4	1	1	8	5.40	2.04	67.47%
Data Analysis, Probability, & Discrete Mathematics	6	0	2	8	5.38	2.20	67.29%
<i>Problem Solving</i>	12	3	1	22	13.18	5.15	59.93%
<i>Calculator</i>	20	2	0	26	16.88	5.98	64.92%

Table 6.5.5: Grade 6 Means and Standard Deviations for Raw Score

	Number of Items			Number of Possible Points	Raw Score		Mean % of Points Available
	MC	CR	SCR		Mean	Standard Deviation	
LAL	36	6		70	41.07	11.18	58.68%
Writing		2		18	9.94	2.79	55.25%
Reading	36	4		52	31.13	9.04	59.86%
Working with Text		21		21	14.39	4.33	68.52%
Analyzing Text	15	4		31	16.74	5.16	54.00%
Math	32	3	8	49	30.12	11.14	61.47%
Number & Numerical Operations	10		3	13	8.22	3.14	63.21%
Geometry & Measurement	9	1	2	14	7.96	3.59	56.84%
Patterns & Algebra	9	1	2	14	9.21	3.43	65.76%
Data Analysis, Probability, & Discrete Mathematics	4	1	1	8	4.74	2.23	59.25%
<i>Problem Solving</i>	<i>17</i>	<i>3</i>	<i>3</i>	<i>29</i>	<i>16.28</i>	<i>7.07</i>	<i>56.14%</i>
<i>Calculator</i>	<i>20</i>	<i>2</i>	<i>0</i>	<i>26</i>	<i>15.65</i>	<i>6.19</i>	<i>60.18%</i>

Table 6.5.6: Grade 7 Means and Standard Deviations for Raw Score

	Number of Items			Number of Possible Points	Raw Score		Mean % of Points Available
	MC	CR	SCR		Mean	Standard Deviation	
LAL	36	6		70	40.46	11.23	57.80%
Writing		2		18	10.50	2.91	58.32%
Reading	36	4		52	29.97	9.02	57.63%
Working with Text	20			20	12.55	4.39	62.75%
Analyzing Text	16	4		32	17.41	5.10	54.42%
Math	32	3	8	49	28.49	11.58	58.13%
Number & Numerical Operations	8	1	2	13	6.84	3.67	52.59%
Geometry & Measurement	9	1	2	14	8.38	3.56	59.84%
Patterns & Algebra	9	1	2	14	8.47	3.52	60.52%
Data Analysis, Probability, & Discrete Mathematics	6	0	2	8	4.80	1.98	59.99%
<i>Problem Solving</i>	<i>16</i>	<i>2</i>	<i>2</i>	<i>24</i>	<i>14.36</i>	<i>6.82</i>	<i>59.85%</i>
<i>Calculator</i>	<i>20</i>	<i>2</i>	<i>0</i>	<i>26</i>	<i>14.81</i>	<i>6.26</i>	<i>56.95%</i>

Table 6.5.7: Grade 8 Means and Standard Deviations for Raw Score

	Number of Items			Number of Possible Points	Raw Score		Mean % of Points Available
	MC	CR	SCR		Mean	Standard Deviation	
LAL	36	6		70	44.17	11.96	63.10%
Writing		2		18	10.93	2.73	60.70%
Reading	36	4		52	33.25	9.79	63.94%
Working with Text	23			23	16.02	5.34	69.65%
Analyzing Text	13	4		29	17.23	4.90	59.40%
Math	32	3	8	49	27.31	11.28	55.74%
Number & Numerical Operations	8	1	2	13	6.82	3.67	52.43%
Geometry & Measurement	9	1	2	14	8.03	3.37	57.36%
Patterns & Algebra	9	1	2	14	7.95	3.28	56.76%
Data Analysis, Probability, & Discrete Mathematics	6	0	2	8	4.52	2.13	56.51%
<i>Problem Solving</i>	21	3	4	34	18.28	7.91	53.77%
<i>Calculator</i>	20	2	0	26	14.63	6.30	56.28%
Science	48	2		54	34.11	10.86	63.17%
Life Science	19	2		25	14.87	5.43	59.48%
Physical Science	17	0		17	10.95	3.61	64.43%
Earth Science	12	0		12	8.29	2.78	69.07%
<i>Comprehension/Recall</i>	9	0		9	5.78	2.15	64.17%
<i>Application</i>	33	2		39	24.52	7.89	62.86%
<i>Data Analysis</i>	6	0		6	3.82	1.62	63.68%

Scale Score Distributions by Content Area and Grade

Descriptive statistics for scale scores and percentage distributions of students' performance levels are summarized in Table 6.5.8 by content area and grade. LAL, mathematics, and science student records flagged as void, not present, or missing were removed. For all test forms, scale scores have a range of 100 to 300. A student is classified as Partially Proficient (PP) if his/her scale score is lower than 200. A student is classified as Advanced Proficient (AP) if his/her scale score is 250 or higher. All other students are classified as Proficient (P).

Table 6.5.8: Descriptive Statistics of Students' Performance Levels by Content and Grade

Test	Grade	Form	N ⁺	Mean	StdDev	Min	Max	%PP	%P	%AP
LAL	3	OP	99581	205.89	26.36	100	300	36.76	56.03	7.21
	4	OP	101020	204.90	30.81	100	300	36.96	55.76	7.28
	5	OP	101491	205.20	28.74	100	300	38.69	55.14	6.17
	6	OP	102347	209.76	26.43	100	300	32.98	59.69	7.33
	7	OP	102339	208.69	32.53	100	300	36.16	51.41	12.43
	8	OP	102135	223.75	27.14	113	300	17.38	63.30	19.32
	3	AL	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	4	AL	24	176.33	26.51	115	242	79.17	20.83	-
	5	AL	12	179.17	20.44	152	209	75.00	25.00	-
	6	AL	1	253.00	-	253	253	-	-	100.00
	7	AL	15	200.07	15.82	173	239	46.67	53.33	-
	8	AL	12	168.33	10.33	154	191	100.00	-	-
	3	BR	4	227.50	38.54	196	279	25.00	50.00	25.00
	4	BR	6	204.83	28.58	176	258	50.00	33.33	16.67
	5	BR	6	193.67	25.52	161	223	50.00	50.00	-
	6	BR	10	209.50	43.66	152	280	60.00	10.00	30.00
	7	BR	4	211.50	56.35	158	291	50.00	25.00	25.00
	8	BR	7	217.43	27.07	185	262	28.57	57.14	14.29
	3	LP	110	191.53	26.08	100	250	53.64	45.45	0.91
	4	LP	138	184.43	32.11	113	273	60.14	37.68	2.17
	5	LP	102	184.71	29.46	125	273	67.65	30.39	1.96
	6	LP	94	189.79	28.45	100	250	57.45	41.49	1.06
	7	LP	103	185.32	36.06	108	281	61.17	34.95	3.88
	8	LP	91	208.31	29.58	140	275	35.16	52.75	12.09
	3	SP	694	182.18	26.86	117	300	73.78	24.50	1.73
	4	SP	656	174.82	26.22	100	250	80.18	19.36	0.46
	5	SP	709	172.52	20.49	100	234	88.15	11.85	-
	6	SP	790	183.05	23.64	100	250	74.68	24.81	0.51
	7	SP	906	165.96	24.64	100	281	90.29	9.38	0.33
	8	SP	906	191.16	20.25	122	261	63.91	35.76	0.33
Math	3	OP	99900	232.03	41.07	100	300	20.74	40.61	38.65
	4	OP	101353	229.53	38.96	100	300	20.29	47.39	32.32
	5	OP	101805	233.98	39.03	100	300	19.04	41.23	39.74
	6	OP	102558	225.54	36.54	100	300	22.22	49.99	27.79

Test	Grade	Form	N⁺	Mean	StdDev	Min	Max	%PP	%P	%AP
Math	7	OP	102373	217.00	41.40	100	300	33.77	41.69	24.53
	8	OP	102061	223.04	43.23	100	300	27.92	41.38	30.70
	3	AL	10	231.10	36.86	172	295	20.00	40.00	40.00
	4	AL	32	198.72	32.04	106	261	43.75	50.00	6.25
	5	AL	3	199.33	24.01	173	220	33.33	66.67	-
	6	AL	93	208.88	35.30	145	300	37.63	50.54	11.83
	7	AL	188	196.58	43.18	105	300	57.45	28.72	13.83
	8	AL	142	212.45	50.57	104	300	42.96	28.87	28.17
	3	BR	4	256.75	54.11	188	300	25.00	25.00	50.00
	4	BR	6	232.67	45.33	173	300	33.33	33.33	33.33
	5	BR	6	208.00	23.19	180	239	50.00	50.00	-
	6	BR	10	203.30	29.70	166	253	50.00	40.00	10.00
	7	BR	5	166.00	68.10	100	274	80.00	-	20.00
	8	BR	7	191.00	47.88	107	244	42.86	57.14	-
	3	LP	112	213.76	40.38	126	300	28.57	49.11	22.32
	4	LP	141	211.82	42.19	120	300	37.59	42.55	19.86
	5	LP	105	209.62	41.92	128	300	40.95	37.14	21.90
	6	LP	94	205.89	36.59	123	292	40.43	44.68	14.89
	7	LP	103	188.45	37.27	112	300	60.19	33.98	5.83
	8	LP	91	197.62	45.30	110	300	47.25	37.36	15.38
	3	SP	696	180.06	37.20	100	300	70.11	23.56	6.32
	4	SP	654	179.10	35.00	100	295	72.94	23.24	3.82
	5	SP	707	181.59	29.78	110	285	72.70	24.47	2.83
	6	SP	790	175.80	28.89	100	292	78.48	19.24	2.28
	7	SP	906	164.28	27.71	100	284	88.30	11.15	0.55
	8	SP	907	165.59	28.77	100	291	87.21	11.91	0.88
Science	4	OP	101319	244.01	34.14	100	300	9.67	42.32	48.01
	8	OP	102128	229.49	33.37	116	300	18.33	52.14	29.53
	4	AL	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	8	AL	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	4	BR	6	225.00	44.51	180	284	50.00	16.67	33.33
	8	BR	7	214.57	32.97	170	266	28.57	57.14	14.29
	4	LP	142	229.11	36.56	137	300	20.42	48.59	30.99
	8	LP	92	216.76	34.65	152	300	29.35	53.26	17.39
	4	SP	654	197.33	29.87	114	296	53.52	41.13	5.35
	8	SP	903	188.30	18.83	131	272	72.43	27.24	0.33

*OP: Operational Test; AL: Alternative Operational Test; BR: Braille; LP: Large Print; SP: Spanish Version

⁺Reflects only valid scale scores

Scale Score Distributions by Demographic Group

Descriptive statistics of scale scores and percentage distributions of students' Performance by Demographic Groups can be found at <http://www.nj.gov/education/schools/achievement/2011/>. Scale score cumulative frequency distributions are attached as Appendix F.

Scale Score Distributions by District Factor Groups (DFG)

New Jersey has an established history of applying DFGs²⁶ in the analysis and reporting of assessment results. DFG is an indicator of the socioeconomic status of citizens in each district and has been useful for the comparative reporting of test results from New Jersey's statewide testing programs. The measure was first developed in 1974 using demographic variables from the 1970 United States Census. A revision was made in 1984 to take into account new data from the 1980 United States Census. The DFG designations were updated again in 1992 after the 1990 census. The current DFG designations are based upon the 2000 census. The DFGs are labeled from A (lowest) to J (highest). Additional DFGs are designated for special groups that are not defined geographically. For example N is used to designate districts with a percentage of students in public schools too low for a DFG value to be assigned; O and S indicate schools receiving special populations; R represents charter schools; and V denotes vocational schools.

Descriptive statistics of scale scores and percentage distributions of student performance by DFG for General Education group are summarized in Tables 6.5.9 through 6.5.11 by content area and grade. For each of the content areas, students who were flagged as “void” or “not present” were removed. For an in-depth analysis of student performance by DFG, please see the statewide summary reports at: <http://www.nj.gov/education/schools/achievement/2011/>

Table 6.5.9: Descriptive Statistics for LAL Performance Levels by DFG

Grade	DFG ⁺	N	Mean	StdDev	Min	Max	%PP	%P	%AP
3	A	18085	191.42	25.48	100	300	59.06	38.89	2.05
	B	10180	198.86	24.28	100	300	47.71	48.86	3.43
	CD	9366	201.22	24.09	109	300	43.95	52.09	3.96
	DE	12176	206.20	24.50	100	300	35.49	58.19	6.32
	FG	11908	209.09	24.36	100	300	30.32	62.46	7.21
	GH	13398	211.56	25.11	100	300	27.88	62.63	9.49
	I	18489	216.51	24.95	109	300	21.13	66.11	12.76
	J	4187	221.70	25.05	123	300	15.09	67.42	17.48
	N	430	192.03	23.61	109	276	60.23	38.14	1.63
	R	2161	199.20	25.63	129	300	48.77	46.41	4.81
4	A	17831	185.89	29.76	100	300	62.20	36.32	1.47
	B	10041	195.35	28.63	100	300	50.27	46.78	2.95
	CD	9592	199.39	28.21	100	300	43.78	52.70	3.52
	DE	12739	205.68	27.89	100	300	34.57	59.58	5.85
	FG	12244	209.14	28.24	100	300	30.39	61.97	7.64
	GH	13847	212.08	29.14	100	300	27.62	62.27	10.11
	I	18968	218.20	28.08	100	300	20.04	66.38	13.58
	J	4339	223.08	28.44	100	300	15.00	67.83	17.17
	N	407	189.57	28.79	100	293	59.95	37.59	2.46
	R	1828	193.58	29.36	100	300	53.28	43.76	2.95

²⁶ For more information on DFGs, see the following link: <http://www.state.nj.us/education/finance/sf/dfg.pdf>

Table 6.5.9 Descriptive Statistics for LAL Performance Levels by DFG (con't)

Grade	DFG ⁺	N	Mean	StdDev	Min	Max	%PP	%P	%AP
5	A	16784	186.08	25.86	100	287	66.51	32.64	0.85
	B	10169	195.05	26.12	100	294	53.78	44.19	2.03
	CD	9680	198.79	26.59	100	300	47.29	49.70	3.01
	DE	12787	205.39	26.20	100	300	37.38	58.03	4.59
	FG	12510	208.59	25.86	100	300	32.22	62.29	5.48
	GH	13928	211.93	27.23	100	300	28.55	63.19	8.26
	I	19375	218.97	26.49	100	300	19.80	67.92	12.28
	J	4409	225.26	25.05	121	300	13.15	69.65	17.19
	N	402	186.32	23.76	111	242	67.91	32.09	-
	R	2271	194.07	27.51	106	280	56.32	40.77	2.91
6	A	16402	193.05	25.20	100	281	58.55	40.10	1.35
	B	10300	201.13	24.58	113	300	45.56	51.79	2.65
	CD	9631	204.71	24.33	100	300	39.29	57.33	3.38
	DE	13121	209.51	23.83	100	300	31.52	63.37	5.11
	FG	12825	212.48	24.49	108	300	27.48	64.92	7.60
	GH	14246	215.76	25.61	113	300	24.55	64.97	10.47
	I	19632	220.85	24.25	108	300	17.46	69.19	13.35
	J	4501	227.13	23.62	129	300	10.82	70.05	19.13
	N	339	196.62	21.98	132	250	55.16	44.54	0.29
	R	2224	201.08	24.88	132	293	47.39	49.19	3.42
7	V	15	212.07	15.44	176	237	13.33	86.67	-
	A	16060	185.56	29.90	100	300	66.05	31.83	2.12
	B	10321	196.88	29.95	100	300	50.86	44.25	4.89
	CD	9614	202.08	30.31	100	300	43.66	49.32	7.02
	DE	13275	207.56	29.60	100	300	36.46	54.46	9.08
	FG	13426	212.27	29.55	100	300	29.90	57.93	12.17
	GH	13858	216.80	30.68	100	300	25.70	57.03	17.28
	I	19969	224.08	29.30	100	300	17.71	59.64	22.65
	J	4363	231.18	28.05	103	300	11.83	57.32	30.85
	N	332	181.53	28.76	103	256	73.19	25.30	1.51
8	R	2114	196.68	30.02	100	300	52.27	43.00	4.73
	V	14	213.29	20.81	183	250	35.71	57.14	7.14

⁺N = majority of students in private schools, O and S = schools receiving special populations; R = charter schools; V = vocational schools

Table 6.5.9: Descriptive Statistics for LAL Performance Levels by DFG (con't)

Grade	DFG⁺	N	Mean	StdDev	Min	Max	%PP	%P	%AP
8	A	15596	203.92	24.60	122	300	41.52	54.33	4.15
	B	10255	214.00	24.52	128	300	25.20	66.34	8.46
	CD	9773	218.01	24.48	122	300	20.29	68.43	11.28
	DE	13456	222.60	24.43	113	300	15.60	69.37	15.03
	FG	13591	225.95	24.91	128	300	13.03	67.88	19.09
	GH	13583	230.54	25.66	137	300	10.35	63.73	25.92
	I	20104	236.97	24.81	122	300	6.18	59.71	34.10
	J	4506	243.03	23.07	149	300	3.20	53.88	42.92
	N ⁺	310	201.89	21.98	140	281	45.16	51.61	3.23
	R	1924	214.64	24.58	143	293	25.73	64.19	10.08
	V	17	228.76	18.70	182	261	5.88	82.35	11.76

⁺N = majority of students in private schools, O and S = schools receiving special populations;
R = charter schools; V = vocational schools

Table 6.5.10: Descriptive Statistics for Mathematics Performance Levels by DFG

Grade	DFG⁺	N	Mean	StdDev	Min	Max	%PP	%P	%AP
3	A	18156	209.76	42.36	100	300	40.14	39.22	20.65
	B	10235	219.52	39.78	100	300	29.94	43.85	26.21
	CD	9401	224.37	38.62	100	300	25.00	45.41	29.59
	DE	12196	233.94	38.57	100	300	18.00	43.15	38.85
	FG	11946	236.46	37.76	100	300	15.67	42.76	41.57
	GH	13445	241.53	37.88	100	300	12.75	40.27	46.98
	I	18543	247.99	36.27	100	300	9.10	36.70	54.20
	J	4199	256.30	34.65	100	300	5.83	29.72	64.44
	N	430	215.10	39.74	100	300	33.26	43.49	23.26
	R	2162	219.01	41.96	100	300	31.50	41.07	27.43
4	A	17890	208.97	40.25	100	300	38.94	44.19	16.86
	B	10098	217.72	37.47	100	300	29.12	50.34	20.54
	CD	9624	222.93	36.47	100	300	23.86	52.03	24.12
	DE	12766	231.35	36.34	100	300	17.30	50.53	32.17
	FG	12277	232.71	36.51	100	300	16.34	49.82	33.84
	GH	13894	237.52	36.60	100	300	13.41	47.25	39.34
	I	19042	244.28	34.78	100	300	9.32	44.25	46.42
	J	4351	251.92	34.15	103	300	5.95	38.66	55.39
	N	406	215.84	36.48	106	300	31.77	48.28	19.95
	R	1830	212.61	39.20	103	300	35.96	45.03	19.02

⁺N = majority of students in private schools, O and S = schools receiving special populations;
R = charter schools; V = vocational schools

Table 6.5.10: Descriptive Statistics for Mathematics Performance Levels by DFG (con't)

Grade	DFG ⁺	N	Mean	StdDev	Min	Max	%PP	%P	%AP
5	A	16827	211.55	38.98	100	300	38.32	42.20	19.48
	B	10228	222.15	37.43	100	300	27.75	45.14	27.11
	CD	9706	225.53	36.60	100	300	23.78	45.85	30.37
	DE	12821	234.62	37.00	100	300	16.75	44.19	39.06
	FG	12545	235.98	35.92	110	300	15.27	44.29	40.44
	GH	13970	242.41	36.78	110	300	12.36	40.00	47.64
	I	19431	250.14	34.90	100	300	8.12	35.06	56.82
	J	4419	259.70	32.26	128	300	3.98	27.72	68.30
	N	402	215.82	38.30	120	300	33.08	42.54	24.38
	R	2272	220.69	38.29	100	300	29.36	43.97	26.67
6	A	16474	204.63	34.93	100	300	43.17	45.09	11.74
	B	10376	214.94	33.88	100	300	30.65	52.31	17.04
	CD	9648	218.04	33.50	100	300	26.69	54.35	18.96
	DE	13125	225.01	34.26	100	300	20.81	53.54	25.65
	FG	12859	227.43	34.89	113	300	19.14	51.98	28.88
	GH	14283	232.22	35.69	100	300	16.22	50.05	33.74
	I	19679	240.27	34.16	113	300	10.19	47.91	41.90
	J	4517	250.02	32.84	131	300	5.62	40.16	54.22
	N	339	215.08	29.48	131	300	26.25	61.36	12.39
	R	2224	213.94	34.91	123	300	33.81	49.33	16.86
7	V	15	218.80	20.15	187	268	13.33	80.00	6.67
	A	16095	192.20	37.02	100	300	58.22	33.56	8.22
	B	10375	202.83	38.16	100	300	46.93	39.94	13.13
	CD	9642	208.48	37.73	100	300	40.87	42.84	16.28
	DE	13291	215.47	39.27	100	300	34.35	43.52	22.13
	FG	13457	218.82	38.41	100	300	30.30	45.59	24.11
	GH	13880	226.12	40.44	100	300	25.16	43.39	31.46
	I	19987	234.78	39.13	100	300	17.43	43.66	38.91
	J	4373	246.30	38.40	121	300	11.69	36.52	51.80
	N	332	187.87	35.79	100	300	65.06	28.31	6.63
8	R	2111	203.15	38.95	100	300	47.04	39.55	13.41
	V	14	194.36	24.94	163	253	71.43	21.43	7.14

⁺N = majority of students in private schools, O and S = schools receiving special populations;
R = charter schools; V = vocational schools

Table 6.5.10: Descriptive Statistics for Mathematics Performance Levels by DFG (con't)

Grade	DFG⁺	N	Mean	StdDev	Min	Max	%PP	%P	%AP
8	A	15573	195.98	40.72	100	300	53.44	34.55	12.01
	B	10279	210.50	40.68	100	300	37.23	43.13	19.64
	CD	9778	214.38	40.32	100	300	33.39	44.46	22.15
	DE	13450	221.75	40.72	100	300	27.28	44.91	27.81
	FG	13597	223.63	40.28	100	300	25.58	45.02	29.40
	GH	13606	232.59	41.76	100	300	19.79	42.00	38.21
	I	20135	241.49	39.80	100	300	13.66	39.45	46.88
	J	4507	250.61	38.34	110	300	9.34	34.01	56.65
	N	309	191.64	34.60	100	300	54.37	38.51	7.12
	R	1923	209.52	41.25	100	300	39.99	40.20	19.81
	V	17	235.76	41.37	167	295	11.76	47.06	41.18

⁺N = majority of students in private schools, O and S = schools receiving special populations;
R = charter schools; V = vocational schools

Table 6.5.11: Descriptive Statistics for Science Performance Levels by DFG

Grade	DFG⁺	N	Mean	StdDev	Min	Max	%PP	%P	%AP
4	A	17866	220.65	34.02	100	300	25.56	52.40	22.04
	B	10089	233.69	32.87	100	300	13.79	51.86	34.35
	CD	9620	239.32	32.20	114	300	9.96	49.62	40.43
	DE	12760	246.97	30.99	100	300	6.17	42.67	51.16
	FG	12277	250.10	31.17	127	300	5.40	39.12	55.48
	GH	13881	252.64	31.22	100	300	4.93	37.02	58.05
	I	19036	257.68	29.60	100	300	3.10	31.99	64.91
	J	4349	261.84	28.81	145	300	2.21	27.57	70.22
	N	406	219.46	32.31	137	300	27.34	52.22	20.44
	R	1830	229.49	34.33	127	300	17.92	52.68	29.40
8	A	15529	206.20	28.70	116	300	42.46	48.86	8.68
	B	10300	217.07	30.16	124	300	27.71	56.26	16.03
	CD	9768	222.58	30.60	116	300	22.25	56.94	20.81
	DE	13437	229.35	31.19	116	300	15.96	56.20	27.84
	FG	13587	232.20	30.59	131	300	13.41	55.77	30.82
	GH	13597	236.60	31.96	137	300	11.83	52.05	36.13
	I	20131	245.19	31.18	131	300	6.62	46.58	46.79
	J	4503	252.46	29.84	131	300	3.78	39.68	56.54
	N	307	202.62	24.98	131	293	47.56	48.53	3.91
	R	1921	217.65	30.24	137	300	27.28	55.91	16.81
	V	17	239.00	27.78	189	300	11.76	52.94	35.29

⁺N = majority of students in private schools, O and S = schools receiving special populations;
R = charter schools; V = vocational schools

PART 7: EQUATING AND SCALING

This section details the equating and scaling procedures applied to the NJ ASK 2011 Operational tests²⁷. Equating and scaling procedures were applied to the Grades 3-8 LAL and Mathematics assessments in addition to the grades 4 and 8 Science assessments.

7.1 Descriptive Statistics for Equating Data

In 2008, data from approximately 35,000 students were used as impact data for standard setting. These data were used to establish new Proficient and Advanced Proficient cut scores for LAL and mathematics in grades 5 through 8. Thus, 2008 became the new base year to which future LAL and mathematics grade 5-8 assessments are equated. Likewise, standard settings were conducted for grades 3-4 LAL and mathematics in 2009; thus, making 2009 the year to which future grades 3-4 LAL and mathematics assessments are equated. The base years for science grades 4 and 8 are 2005 and 2000, respectively. The 2011 assessments were placed on the corresponding base-year scale using common item non-equivalent group equating design based on an equating sample of approximately 30% of the total student population in LAL, mathematics, and science. The NJ ASK 2011 equating samples are summarized in Table 7.1.1. Generally, less than 1.5 % of the records was invalid and removed from analyses.

Table 7.1.1: N-Counts for the Equating Samples by Content and Grade⁺

Test	Total	Percent	Valid	Invalid*
LAL 3	32544	32.42	32115	32544
LAL 4	33317	32.72	33068	33317
LAL 5	33761	33.00	33325	33761
LAL 6	32780	32.00	32306	32780
LAL 7	32846	31.78	32423	32846
LAL 8	32109	31.41	31725	32109
<hr/>				
Math 3	32807	32.58	32474	333
Math 4	32746	32.06	32411	335
Math 5	33746	32.89	33395	351
Math 6	32714	31.87	32379	335
Math 7	32899	31.82	32520	379
Math 8	32056	31.38	31689	367
<hr/>				
Science 4	33591	32.90	33208	33591
Science 8	32288	31.59	31885	32288

*Invalidation occurs when void codes are applied or a non-attempt flag is present

⁺Please Note: All Tables in Part 7 are based on the equating sample

The 2011 equating sample was selected using a stratified random sampling methodology with DFG as a stratum. In addition, the samples were representative of the total student population in terms of demographic variables such as gender ethnicity, economic status, and Current Limited

²⁷ All equating results are verified by two external reviewers.

English Proficiency (CLEP). Comparisons between data from the 2011 form distribution plan and the sample data used for equating and scaling are presented in Tables 7.1.2 to 7.1.7. These tables show the differences between the 2011 form distribution plan and the equating sample to be less than 2% for any DFG group across all tests.

Table 7.1.2: Comparison of the Equating Sample and the Statewide DFGs - Grade 3

DFG ⁺⁺	Statewide Distribution	LAL		Math ⁺	
		Obs(%)	Diff	Obs(%)	Diff
A	17.79	17.34	-0.45	17.64	-0.15
B	10.07	9.51	-0.56	9.33	-0.74*
CD	9.29	9.38	0.09	9.35	0.06
DE	12.40	12.81	0.41	12.78	0.38
FG	11.92	11.61	-0.31	11.61	-0.31
GH	13.53	13.77	0.24	13.72	0.19
I	18.73	18.97	0.24	18.86	0.13
J	4.19	4.65	0.46	4.65	0.46
N	0.44	0.00	-0.44	0.00	-0.44
R	1.62	1.97	0.35	1.97	0.35
S	0.00	0.00	0.00	0.04	0.04
V	0.00	0.00	0.00	0.00	0.00

*Indicates the maximum difference between statewide distribution and the sample.

⁺Includes nine math students for whom a DFG was not reported

⁺⁺N = majority of students in private schools, O and S = schools receiving special populations; R = charter schools; V = vocational schools

Table 7.1.3: Comparison of the Equating Sample and the Statewide DFGs - Grade 4

DFG ⁺⁺	Statewide Distribution	LAL		Math ⁺		Science ⁺	
		Obs(%)	Diff	Obs(%)	Diff	Obs(%)	Diff
A	17.06	16.95	-0.11	16.82	-0.24	17.04	-0.02
B	10.19	8.95	-1.24*	9.28	-0.91	9.16	-1.03
CD	9.14	9.39	0.25	9.44	0.30	9.38	0.24
DE	12.59	13.15	0.56	13.29	0.70	13.14	0.55
FG	12.28	11.85	-0.43	11.69	-0.59	11.52	-0.76
GH	13.63	13.81	0.18	13.67	0.04	13.81	0.18
I	18.87	19.22	0.35	19.04	0.17	19.17	0.30
J	4.34	4.83	0.49	4.92	0.58	4.84	0.50
N	0.39	0.00	-0.39	0.00	-0.39	0.00	-0.39
R	1.51	1.85	0.34	1.73	0.22	1.84	0.33
S	0.00	0.00	0.00	0.05	0.05	0.04	0.04
V	0.00	0.00	0.00	0.00	0.00	0.00	0.00

*Indicates the maximum difference between statewide distribution and the sample.

⁺⁺N = majority of students in private schools, O and S = schools receiving special populations; R = charter schools; V = vocational schools

Table 7.1.4: Comparison of the Equating Sample and the Statewide DFGs - Grade 5

DFG ⁺⁺	Statewide Distribution	LAL		Math	
		Obs(%)	Diff	Obs(%)	Diff
A	15.61	15.79	0.18	15.78	0.17
B	9.79	8.89	-0.90*	8.89	-0.90*
CD	9.68	9.65	-0.03	9.63	-0.05
DE	12.57	12.73	0.16	12.72	0.15
FG	12.33	12.40	0.07	12.38	0.05
GH	13.25	13.78	0.53	13.79	0.54
I	18.57	19.40	0.83	19.43	0.86
J	4.18	4.96	0.78	4.97	0.79
N	0.38	0.00	-0.38	0.00	-0.38
R	2.04	2.39	0.35	2.40	0.36
S	0.38	0.00	-0.38	0.00	-0.38
V	0.03	0.00	-0.03	0.00	-0.03

*Indicates the maximum difference between statewide distribution and the sample.

⁺⁺N = majority of students in private schools, O and S = schools receiving special populations; R = charter schools; V = vocational schools

Table 7.1.5: Comparison of the Equating Sample and the Statewide DFGs - Grade 6

DFG ⁺⁺	Statewide Distribution	LAL		Math	
		Obs(%)	Diff	Obs(%)	Diff
A	15.53	14.98	-0.55	15.16	-0.37
B	10.02	9.64	-0.38	9.69	-0.33
CD	9.30	9.49	0.19	9.51	0.21
DE	12.95	12.70	-0.25	12.68	-0.27
FG	12.52	12.80	0.28	12.76	0.24
GH	13.66	14.20	0.54	14.24	0.58
I	19.26	20.10	0.84	20.15	0.89*
J	4.41	3.82	-0.59	3.54	-0.87
N	0.36	0.00	-0.36	0.00	-0.36
R	1.94	2.28	0.34	2.26	0.32
S	0.00	0.00	0.00	0.00	0.00
V	0.02	0.00	-0.02	0.00	-0.02

*Indicates the maximum difference between statewide distribution and the sample.

⁺⁺N = majority of students in private schools, O and S = schools receiving special populations; R = charter schools; V = vocational schools

Table 7.1.6: Comparison of the Equating Sample and the Statewide DFGs - Grade 7

DFG ⁺⁺	Statewide Distribution	LAL		Math	
		Obs(%)	Diff	Obs(%)	Diff
A	15.21	14.33	-0.88	14.74	-0.47
B	9.93	9.82	-0.11	9.91	-0.02
CD	9.50	10.31	0.81	10.36	0.86
DE	12.91	12.15	-0.76	12.19	-0.72
FG	13.01	12.94	-0.07	12.96	-0.05
GH	13.37	13.32	-0.05	13.33	-0.04
I	19.67	20.90	1.23	20.95	1.28*
J	4.19	4.24	0.05	3.56	-0.63
N	0.36	0.00	-0.36	0.00	-0.36
R	1.80	1.96	0.16	1.96	0.16
S	0.00	0.01	0.01	0.01	0.01
V	0.01	0.00	-0.01	0.00	-0.01

*Indicates the maximum difference between statewide distribution and the sample.

⁺⁺N = majority of students in private schools, O and S = schools receiving special populations; R = charter schools; V = vocational schools

Table 7.1.7: Comparison of the Equating Sample and the Statewide DFGs - Grade 8

DFG ⁺⁺	Statewide Distribution	LAL		Math		Science	
		Obs(%)	Diff	Obs(%)	Diff	Obs(%)	Diff
A	15.48	14.34	-1.14	14.44	-1.04	14.44	-1.04
B	10.02	9.75	-0.27	9.75	-0.27	9.78	-0.24
CD	9.65	10.08	0.43	10.07	0.42	10.07	0.42
DE	13.11	12.64	-0.47	12.66	-0.45	12.60	-0.51
FG	13.48	12.67	-0.81	12.65	-0.83	12.63	-0.85
GH	13.18	13.30	0.12	13.26	0.08	13.28	0.10
I	19.02	20.86	1.84	20.97	1.95*	20.88	1.86
J	4.09	4.37	0.28	4.22	0.13	4.36	0.27
N	0.33	0.00	-0.33	0.00	-0.33	0.00	-0.33
R	1.56	1.94	0.38	1.93	0.37	1.93	0.37
S	0.00	0.00	0.00	0.00	0.00	0.00	0.00
V	0.01	0.00	-0.01	0.00	-0.01	0.00	-0.01

*Indicates the maximum difference between statewide distribution and the sample.

⁺⁺N = majority of students in private schools, O and S = schools receiving special populations; R = charter schools; V = vocational schools

Tables 7.1.8 through 7.1.10 present the N-counts for the 2011 equating samples by DFG, gender, and ethnicity. Note that the sum for males and females does not equal the total in Table 7.1.1 as some examinees did not make a selection for gender. Similarly, some examinees did not identify

ethnicity or marked multiple ethnicities, therefore the sum over ethnic groups does not equal the total number of students. Also reported in Tables 7.1.8 through 7.1.10 are the numbers of economically disadvantaged students as well as CLEP students.

Table 7.1.8: Equating Sample N-Counts by Gender and Ethnicity: LAL

Test		Indian Hawaii									
Grade	DFG ⁺	Male	Female	Asian	Black	Hispanic	Alaska	Pacific	White	EconDis	LEP ¹
LAL 3	A	2835	2686	82	1766	3203	8	18	408	4659	1054
	B	1530	1522	71	462	906	8	8	1579	1756	180
	CD	1539	1471	195	648	709	1	1	1396	1419	121
	DE	2110	2000	488	585	669	3	22	2289	1126	101
	FG	1930	1794	255	237	398	7	17	2760	627	71
	GH	2297	2116	642	425	525	8	7	2706	778	138
	I	3088	3003	1128	322	383	7	15	3965	423	87
	J	744	745	497	60	41	1	0	869	37	16
	R	276	354	28	405	130	1	3	48	449	0
	Total	16349	15691	3386	4910	6964	44	91	16020	11274	1768
LAL 4	A	2903	2679	78	1863	3188	10	18	402	4708	635
	B	1551	1404	51	496	874	7	9	1500	1647	118
	CD	1608	1488	199	745	680	4	4	1403	1451	70
	DE	2182	2162	440	615	746	2	18	2469	1181	87
	FG	2037	1880	247	215	368	1	12	3033	643	45
	GH	2332	2231	631	475	586	6	8	2781	856	104
	I	3236	3115	1146	370	368	3	20	4197	448	60
	J	783	814	533	59	75	1	1	904	40	22
	R	298	305	24	391	122	2	2	58	428	1
	Total	16930	16078	3349	5229	7007	36	92	16747	11402	1142
LAL 5	A	2648	2598	84	1677	2974	11	7	433	4302	490
	B	1544	1417	65	508	865	2	7	1486	1654	112
	CD	1653	1554	210	797	707	2	1	1441	1495	53
	DE	2159	2077	424	642	652	6	9	2454	1135	41
	FG	2167	1960	250	240	410	5	20	3139	702	34
	GH	2368	2223	611	469	518	4	9	2877	817	78
	I	3246	3215	1192	395	364	6	12	4222	448	40
	J	863	789	517	61	64	0	1	988	50	14
	O	2	0	0	1	0	0	0	1	0	0
	R	386	410	19	540	161	1	4	62	592	2
	Total	17036	16243	3372	5330	6715	37	70	17103	11195	864

¹Students in current LEP status in 2011

⁺N = majority of students in private schools, O and S = schools receiving special populations; R = charter schools; V = vocational schools

Table 7.1.8: Equating Sample N-Counts by Gender and Ethnicity LAL (continued)

Test		Indian Hawaii									
Grade	DFG ⁺	Male	Female	Asian	Black	Hispanic	Alaska	Pacific	White	EconDis	LEP ¹
LAL 6	A	2460	2352	63	1571	2718	9	9	399	3722	382
	B	1612	1497	65	494	888	4	6	1623	1635	76
	CD	1524	1535	200	817	625	7	3	1353	1402	30
	DE	2119	1973	377	654	684	1	13	2315	1146	35
	FG	2136	1995	224	253	366	2	18	3220	628	31
	GH	2317	2264	564	502	525	7	5	2905	739	56
	I	3274	3212	1091	406	358	6	18	4516	425	22
	J	625	609	462	61	51	1	0	652	53	10
	R	355	380	38	487	157	0	0	44	545	4
	Total	16422	15817	3084	5245	6372	37	72	17027	10295	646
LAL 7	A	2334	2295	74	1498	2609	11	14	371	3565	278
	B	1657	1522	54	532	822	4	9	1717	1570	63
	CD	1757	1580	192	814	635	6	4	1616	1457	35
	DE	1987	1944	357	610	659	8	14	2244	1143	40
	FG	2145	2045	247	280	390	3	16	3215	643	44
	GH	2255	2058	565	474	494	4	3	2726	726	54
	I	3521	3253	1096	388	348	2	16	4832	430	39
	J	689	684	436	53	49	0	0	824	39	13
	O	5	1	0	2	2	0	0	0	3	0
	R	282	353	12	413	155	0	2	47	447	3
	S	3	1	0	2	1	0	0	1	4	0
	Total	16635	15736	3033	5066	6164	38	78	17593	10027	569
LAL 8	A	2287	2254	88	1433	2572	10	9	346	3378	383
	B	1532	1559	77	454	903	6	9	1614	1525	79
	CD	1614	1579	190	774	641	9	2	1516	1386	39
	DE	2047	1958	361	621	667	3	17	2308	1120	31
	FG	1997	2020	204	270	362	6	21	3109	546	22
	GH	2141	2075	548	441	458	9	5	2691	648	46
	I	3388	3223	1032	422	371	5	10	4701	442	30
	J	713	673	508	67	62	0	1	737	43	10
	O	11	1	0	4	3	0	0	3	6	0
	R	274	341	19	400	149	0	1	40	424	0
	S	1	0	0	1	0	0	0	0	0	0
	Total	16005	15683	3027	4887	6188	48	75	17065	9518	640

¹Students in current LEP status in 2011

⁺N = majority of students in private schools, O and S = schools receiving special populations;

R = charter schools; V = vocational schools

Table 7.1.9: Equating Sample N-Counts by Gender and Ethnicity: Mathematics

Test Grade	DFG ⁺	Indian Hawaii										
		Male	Female	Asian	Black	Hispanic	Alaska	Pacific	White	EconDis	LEP ¹	
Math 3	A	2829	2717	86	1780	3218	8	18	380	4638	1076	
	B	1486	1484	73	451	928	7	6	1488	1695	190	
	CD	1528	1454	196	639	691	1	1	1398	1419	124	
	DE	2102	1990	478	585	669	3	21	2290	1129	103	
	FG	1947	1792	260	238	403	7	16	2765	624	85	
	GH	2292	2109	646	417	524	8	7	2706	761	152	
	I	3039	2925	1117	320	376	7	15	3931	419	102	
	J	753	751	503	63	40	1	0	876	40	23	
	O	1	0	0	0	0	0	0	1	0	0	
	R	276	353	28	409	129	1	3	48	451	0	
	S	5	0	1	3	1	0	0	0	3	0	
		Total	16258	15575	3388	4905	6979	43	87	15883	11179	1855
Math 4	A	2765	2533	82	1777	2981	10	19	395	4426	594	
	B	1547	1375	57	456	833	8	8	1537	1561	114	
	CD	1567	1426	194	715	660	3	4	1361	1410	65	
	DE	2136	2115	439	600	711	1	17	2426	1143	86	
	FG	1940	1808	244	205	355	0	11	2899	610	46	
	GH	2243	2135	615	439	558	7	7	2685	811	110	
	I	3035	2919	1117	331	348	3	16	4010	416	76	
	J	775	801	528	57	73	1	1	894	40	23	
	O	3	1	0	0	0	0	0	0	0	0	
	R	274	276	24	350	115	2	2	56	383	1	
	S	4	0	0	2	1	0	0	2	2	0	
		Total	16289	15389	3300	4932	6635	35	85	16265	10802	1115
Math 5	A	2649	2605	90	1676	2973	11	7	437	4305	501	
	B	1545	1423	66	511	865	2	7	1489	1658	120	
	CD	1656	1549	214	795	708	4	1	1435	1497	56	
	DE	2161	2081	427	645	652	6	9	2453	1136	48	
	FG	2168	1960	253	237	410	5	19	3141	702	38	
	GH	2377	2229	625	471	518	4	9	2876	824	94	
	I	3257	3223	1200	395	365	6	12	4229	450	52	
	J	869	792	523	61	64	0	1	990	50	23	
	O	2	0	0	1	0	0	0	1	0	0	
	R	389	411	19	543	161	1	4	62	595	2	
		Total	17073	16273	3417	5335	6716	39	69	17113	11217	934

¹Students in current LEP status in 2011

⁺N = majority of students in private schools, O and S = schools receiving special populations;
R = charter schools; V = vocational schools

**Table 7.1.9: Equating Sample N-Counts by Gender and Ethnicity: Mathematics
(continued)**

Test	Grade	DFG	Indian Hawaii									
			Male	Female	Asian	Black	Hispanic	Alaska	Pacific	White	EconDis	LEP ¹
Math 6	A	2505	2375	64	1602	2747	10	9	402	3775	406	
	B	1631	1504	66	498	889	4	6	1641	1652	86	
	CD	1535	1536	202	821	628	7	4	1354	1411	38	
	DE	2121	1975	379	657	680	1	14	2315	1144	40	
	FG	2135	1992	224	252	366	2	18	3217	633	35	
	GH	2334	2271	572	509	528	7	5	2909	748	67	
	I	3290	3227	1099	409	360	6	18	4527	434	41	
	J	587	559	456	59	42	1	0	585	51	20	
	O	1	0	0	1	0	0	0	0	0	0	
	R	354	379	38	485	157	0	0	44	544	4	
Total		16493	15818	3100	5293	6397	38	74	16994	10392	737	
Math 7	A	2411	2365	78	1534	2698	11	14	371	3642	403	
	B	1686	1532	53	536	844	4	10	1726	1588	86	
	CD	1774	1587	196	823	642	6	4	1620	1474	42	
	DE	2005	1952	362	615	661	8	13	2259	1150	54	
	FG	2152	2055	253	281	394	3	16	3215	651	54	
	GH	2263	2065	575	473	504	4	3	2721	730	80	
	I	3546	3265	1109	389	353	2	17	4844	436	55	
	J	587	570	411	52	33	0	0	655	36	13	
	O	4	1	0	1	2	0	0	0	3	0	
	R	284	354	12	416	155	0	2	47	450	3	
Total		16715	15747	3049	5122	6287	38	79	17459	10164	790	
Math 8	A	2317	2251	90	1435	2590	11	10	344	3396	408	
	B	1537	1550	78	453	904	6	9	1609	1524	85	
	CD	1606	1579	189	775	645	8	2	1505	1385	43	
	DE	2051	1957	364	616	671	3	17	2309	1127	37	
	FG	1993	2015	209	265	361	6	21	3101	544	27	
	GH	2136	2060	554	440	454	9	5	2669	643	51	
	I	3393	3244	1044	424	375	5	10	4709	445	45	
	J	686	651	504	67	60	0	0	696	44	13	
	O	11	1	0	3	3	0	0	3	6	0	
	R	274	338	19	396	150	0	1	40	423	0	
Total		16005	15646	3051	4875	6213	48	75	16985	9537	709	

¹Students in current LEP status in 2011

[†]N = majority of students in private schools, O and S = schools receiving special populations;
R = charter schools; V = vocational schools

Table 7.1.10: Equating Sample N-Counts by Gender and Ethnicity: Science

Test Grade	DFG ⁺	Indian Hawaii									
		Male	Female	Asian	Black	Hispanic	Alaska Pacific	White	EconDis	LEP ¹	
Science 4	A	2861	2618	83	1818	3127	10	19	403	4581	646
	B	1566	1388	57	463	855	6	9	1542	1602	119
	CD	1591	1457	195	733	668	4	4	1395	1424	60
	DE	2160	2146	442	605	723	1	17	2465	1163	89
	FG	1964	1819	248	209	355	1	11	2920	617	43
	GH	2325	2213	630	465	575	7	8	2783	844	110
	I	3138	3008	1142	365	360	3	18	4126	447	74
	J	779	813	534	57	73	1	1	904	40	27
	O	2	0	0	0	0	0	0	0	0	0
	R	298	302	24	392	121	2	2	58	422	1
	S	3	0	0	2	1	0	0	1	3	0
Total		16687	15764	3355	5109	6858	35	89	16597	11143	1169
Science 8	A	2332	2261	90	1460	2592	11	9	349	3413	408
	B	1548	1566	78	456	904	6	9	1634	1541	85
	CD	1621	1586	191	779	644	9	2	1520	1386	42
	DE	2061	1953	364	621	672	3	17	2309	1127	37
	FG	2002	2022	208	273	361	6	21	3109	546	27
	GH	2153	2075	553	443	457	9	5	2695	656	51
	I	3403	3246	1044	425	376	5	10	4718	445	45
	J	717	673	511	67	64	0	1	736	44	13
	O	12	1	0	4	3	0	0	3	6	0
	R	273	341	19	398	150	0	1	40	424	0
	S	1	0	0	1	0	0	0	0	0	0
Total		16123	15724	3058	4927	6223	49	75	17113	9588	708

¹Students in current LEP status in 2011

⁺N = majority of students in private schools, O and S = schools receiving special populations;

R = charter schools; V = vocational schools

Table 7.1.11 displays descriptive statistics for raw scores for the equating samples by grade and test content. Table 7.1.12 summarizes descriptive statistics for raw scores for the equating samples by gender. Tables 7.1.13 through 7.1.15 summarize descriptive statistics for raw scores for the samples by DFG. Note that the maximum possible score was not achieved in LAL at any grade level; whereas, the maximum possible score was achieved at all grade levels in mathematics and science.

Table 7.1.11: Descriptive Statistics for Raw Scores by Grade and Test Content

Test	N	Mean	STD	Min	Max	Max Possible
LAL 3	32115	26.54	6.73	0	46	50
LAL 4	33068	33.25	8.16	0	53	56
LAL 5	33325	34.86	9.25	0	58	63
LAL 6	32306	42.03	10.16	0	68	70
LAL 7	32423	41.62	10.22	0	67	70
LAL 8	31725	45.35	10.77	1	69	70
<hr/>						
Math 3	32474	32.96	10.33	0	50	50
Math 4	32411	32.62	10.06	0	50	50
Math 5	33395	33.07	10.54	0	50	50
Math 6	32379	30.74	10.69	0	49	49
Math 7	32520	29.23	11.19	0	49	49
Math 8	31689	28.31	10.88	0	49	49
<hr/>						
Science 4	33208	25.48	6.73	0	39	39
Science 8	31885	35.05	10.10	1	54	54

Table 7.1.12: Descriptive Statistics for Raw Scores by Gender

Test	Gender	N	Mean	STD	Min	Max
LAL 3	Male	16349	25.64	6.66	0	45
LAL 4	Male	16930	32.29	8.33	0	52
LAL 5	Male	17035	33.85	9.31	0	58
LAL 6	Male	16422	40.53	10.42	0	68
LAL 7	Male	16635	40.38	10.44	0	67
LAL 8	Male	16005	43.92	10.99	3	69
<hr/>						
Math 3	Male	16258	33.12	10.41	0	50
Math 4	Male	16289	32.78	10.24	0	50
Math 5	Male	17073	33.22	10.78	0	50
Math 6	Male	16493	30.64	10.99	0	49
Math 7	Male	16715	29.49	11.52	0	49
Math 8	Male	16005	28.61	11.27	0	49
<hr/>						
Science 4	Male	16687	25.67	6.85	0	39
Science 8	Male	16123	35.57	10.52	4	54

Table 7.1.12: Descriptive Statistics for Raw Scores by Gender (continued)

Test	Gender	N	Mean	STD	Min	Max
LAL 3	Female	15691	27.49	6.68	0	46
LAL 4	Female	16076	34.29	7.83	0	53
LAL 5	Female	16242	35.94	9.05	0	58
LAL 6	Female	15817	43.62	9.61	0	68
LAL 7	Female	15736	42.94	9.81	0	67
LAL 8	Female	15683	46.82	10.32	1	69
Math 3	Female	15575	32.98	10.16	0	50
Math 4	Female	15389	32.65	9.74	0	50
Math 5	Female	16273	32.94	10.28	0	50
Math 6	Female	15818	30.88	10.36	0	49
Math 7	Female	15747	28.98	10.80	0	49
Math 8	Female	15646	28.01	10.46	0	49
Science 4	Female	15764	25.39	6.49	0	39
Science 8	Female	15724	34.53	9.61	1	54

Table 7.1.13: Descriptive Statistics for Raw Score by District Factor Group: LAL

Test	DFG ⁺	N	Mean	STD	Min	Max
LAL 3	A	5569	22.79	6.66	0	42
	B	3054	24.91	6.29	2	46
	CD	3011	25.09	6.33	4	44
	DE	4113	26.90	6.38	0	44
	FG	3727	27.22	6.18	0	43
	GH	4423	27.85	6.40	2	44
	I	6093	28.95	6.15	0	46
	J	1492	31.13	5.64	6	45
	R	632	24.75	6.42	6	42
	S	1	4.00	0.00	4	4
LAL 4	A	5605	28.26	8.30	0	52
	B	2959	31.29	7.92	0	50
	CD	3106	31.22	7.97	0	49
	DE	4347	33.42	7.58	0	52
	FG	3919	34.43	7.05	0	51
	GH	4567	34.87	7.69	0	52
	I	6356	36.47	7.12	0	53
	J	1598	38.33	6.60	9	52
	R	611	31.10	7.88	0	49

⁺N = majority of students in private schools, O and S = schools receiving special populations; R = charter schools; V = vocational schools

Table 7.1.13: Descriptive Statistics for Raw Score by District Factor Group: LAL (continued)

Test	DFG⁺	N	Mean	STD	Min	Max
LAL 5	A	5259	28.93	8.52	2	54
	B	2963	31.85	8.69	0	54
	CD	3217	32.44	8.87	7	58
	DE	4243	35.12	8.64	4	58
	FG	4134	35.65	8.22	0	56
	GH	4591	36.80	8.80	5	57
	I	6467	39.00	8.26	0	58
	J	1652	41.23	7.37	8	58
	O	2	31.00	19.80	17	45
	R	797	31.51	9.38	5	53
LAL 6	A	4838	35.53	10.15	0	62
	B	3113	39.28	9.91	0	65
	CD	3067	39.79	9.60	7	64
	DE	4102	42.21	9.27	0	66
	FG	4135	43.47	9.06	0	65
	GH	4588	43.83	9.78	0	68
	I	6493	46.02	9.10	0	68
	J	1235	48.30	8.14	14	68
	R	735	39.75	10.06	11	64
	S					
LAL 7	A	4645	34.32	9.57	0	63
	B	3184	38.62	9.69	0	65
	CD	3343	39.11	9.67	0	63
	DE	3938	41.47	9.39	0	64
	FG	4197	42.77	9.41	8	65
	GH	4320	43.45	9.57	2	66
	I	6776	46.46	8.95	0	67
	J	1375	47.90	8.30	16	65
	O	6	33.33	9.50	22	44
	R	635	38.92	9.90	14	63
	S	4	24.00	2.94	21	27
LAL 8	A	4550	37.08	10.77	4	68
	B	3094	42.46	10.05	9	69
	CD	3198	42.78	10.39	1	68
	DE	4010	45.66	9.69	10	68
	FG	4018	46.61	9.72	4	67
	GH	4221	47.49	9.81	6	68
	I	6618	50.07	9.18	3	69
	J	1386	52.76	7.83	16	69
	O	13	26.69	14.17	6	52
	R	616	42.23	10.28	17	64
	S	1	15.00	0.00	15	15

⁺N = majority of students in private schools, O and S = schools receiving special populations; R = charter schools; V = vocational schools

Table 7.1.14: Descriptive Statistics for Raw Scores by District Factor Group: Mathematics

Test	DFG⁺	N	Mean	STD	Min	Max
Math 3	A	5727	27.00	10.90	0	50
	B	3030	30.79	9.95	0	50
	CD	3037	30.72	9.63	5	50
	DE	4151	34.09	9.90	0	50
	FG	3769	33.65	9.34	4	50
	GH	4455	34.98	9.35	2	50
	I	6124	36.70	8.88	0	50
	J	1511	39.84	7.78	6	50
	O	17	15.41	7.79	6	32
	R	640	30.21	10.80	4	50
	S	13	22.38	9.91	7	35
Math 4	A	5453	27.42	10.66	0	50
	B	3008	30.28	9.74	0	50
	CD	3059	30.20	9.86	0	50
	DE	4306	33.29	9.63	3	50
	FG	3790	33.44	9.14	0	50
	GH	4429	34.31	9.29	0	50
	I	6172	36.20	8.62	0	50
	J	1594	38.70	8.05	0	50
	O	24	14.83	8.23	5	38
	R	561	29.73	10.63	4	50
	S	15	12.00	6.89	3	27
Math 5	A	5269	27.44	10.84	0	50
	B	2970	29.96	10.26	0	50
	CD	3215	30.58	10.29	0	50
	DE	4249	33.41	10.26	0	50
	FG	4135	33.67	9.53	3	50
	GH	4606	34.88	9.86	4	50
	I	6487	36.99	9.22	0	50
	J	1661	39.80	8.22	5	50
	O	2	24.50	13.44	15	34
	R	801	30.76	10.79	5	50
Math 6	A	4909	24.34	10.45	0	49
	B	3139	28.32	10.05	0	49
	CD	3079	28.16	10.01	3	49
	DE	4105	31.01	10.25	3	49
	FG	4130	32.13	9.72	0	49
	GH	4612	32.54	10.24	2	49
	I	6524	34.59	9.86	0	49
	J	1147	37.87	9.12	0	49
	O	1	6.00	0.00	6	6
	R	733	28.68	10.85	4	49

⁺N = majority in private schools, O & S = schools receiving special populations; R = charter schools; V = vocational

**Table 7.1.14: Descriptive Statistics for Raw Scores by District Factor Group: Mathematics
(continued)**

Test	DFG ⁺	N	Mean	STD	Min	Max
Math 7	A	4793	22.43	10.04	0	49
	B	3223	25.82	10.47	0	49
	CD	3369	26.65	10.64	3	49
	DE	3965	29.74	10.84	3	49
	FG	4216	29.80	10.40	3	49
	GH	4335	31.17	10.73	0	49
	I	6813	34.04	10.24	0	49
	J	1159	36.32	9.96	6	49
	O	5	17.40	10.33	9	33
	R	638	27.21	11.20	4	49
	S	4	10.25	3.40	7	15
Math 8	A	4577	21.46	10.01	0	49
	B	3090	25.52	10.06	0	49
	CD	3190	25.42	10.22	0	49
	DE	4013	28.80	10.57	1	49
	FG	4010	28.65	9.88	0	49
	GH	4202	30.49	10.31	0	49
	I	6644	32.67	10.08	0	49
	J	1337	35.58	9.72	5	49
	O	12	14.25	9.31	5	37
	R	613	25.46	10.74	4	49
	S	1	11.00	0.00	11	11

⁺N = majority of students in private schools, O and S = schools receiving special populations;
R = charter schools; V = vocational schools

Table 7.1.15: Descriptive Statistics for Raw Scores by District Factor Group: Science

Test	DFG ⁺	N	Mean	STD	Min	Max
Science 4	A	5658	20.81	6.87	0	38
	B	3041	24.24	6.42	5	38
	CD	3116	24.39	6.55	0	39
	DE	4362	25.99	6.16	2	39
	FG	3824	27.03	5.78	4	39
	GH	4587	26.64	6.24	2	39
	I	6367	27.96	5.78	0	39
	J	1606	29.15	5.48	6	39
	O	22	15.86	8.33	5	34
	R	611	23.49	6.71	6	38
	S	14	15.71	7.61	6	28

⁺N = majority of students in private schools, O and S = schools receiving special populations;
R = charter schools; V = vocational schools

Table 7.1.15: Descriptive Statistics for Raw Scores by District Factor Group: Science (continued)

Test	DFG ⁺	N	Mean	STD	Min	Max
Science 8	A	4603	27.31	9.00	1	53
	B	3117	32.32	9.56	5	54
	CD	3211	32.58	9.73	4	54
	DE	4019	35.63	9.29	4	54
	FG	4026	36.55	9.01	6	54
	GH	4234	36.65	9.48	8	54
	I	6656	39.65	8.97	6	54
	J	1390	41.34	8.26	6	54
	O	13	21.46	9.75	13	45
	R	615	31.55	9.66	8	53
	S	1	19.00	0.00	19	19

[†]N = majority of students in private schools, O and S = schools receiving special populations;
R = charter schools; V = vocational schools

7.2 Equating and Scaling Procedures

Item Calibration

In order to accomplish equating and scaling for LAL and mathematics in grades 3-8 and science in grades 4 and 8, the NJ ASK 2011 operational tests were calibrated using Winsteps (Linacre, 2006)²⁸. Winsteps is designed to produce a single scale by jointly analyzing data resulting from students' responses to both multiple-choice and open-ended items. Multiple-choice items were calibrated using the Rasch model (Rasch, 1960²⁹, Wright & Stone, 1979³⁰; Anderich, 1978³¹), while the partial credit model (Masters, 1982)³² was used for open-ended items.

Rasch scaling is “a method for obtaining objective, fundamental, linear measures from stochastic observations of ordered category responses” (Linacre, 2006, p.10). In the Rasch model, the probability of a correct response to item i given θ is:

$$P_i(\theta) = \frac{e^{(\theta-b_i)}}{1+e^{(\theta-b_i)}}$$

where θ = latent trait or ability level and
 b_i = the difficulty parameter for item i .

²⁸ Linacre, J. M. (2006). *A User's Guide to WINSTEPS MINISTEP Rasch-Model Computer Programs*. Chicago

²⁹ Rasch, G. (1960). *Probabilistic models for some intelligence and attainment tests*. Copenhagen: Danish Institute for Educational Research.

³⁰ Wright, B. D., & Stone, M. H. (1979). *Best test design*. Chicago: MESA Press.

³¹ Anderich, D. (1978). A rating formulation for ordered response categories. *Psychometrika*, 43, 561-573.

³² Masters, G. N. (1982). A Rasch model for partial credit scoring. *Psychometrika*, 47, 149-174.

Similar to other IRT models (Hambleton, 1989³³; Hambleton & Swaminathan, 1985³⁴), the Rasch model requires an assumption of unidimensionality (Smith, Jr., 2004)³⁵. Unidimensionality means that all items measure a single construct. If the data fit the model, the measurement units (logits) have the desirable property of maintaining the same size over the whole continuum. These interval measures may then be used in subsequent statistical analyses that assume an interval scale (Smith, Jr., 2004). Also, like other IRT models, the Rasch model allows for separability of parameter estimates (Hambleton, Swaminathan, & Rogers, 1991³⁶; van der Linden & Hambleton, 1997³⁷). That is, the ability estimates of persons are freed from the distributional properties of the specific items attempted. Likewise, the estimated difficulties of items are freed from the distributional properties of specific examinees used in the calibration. This property was useful for the Braille and Large Print test score scaling described below in Section 7.4.

The following steps detail the procedure used to equate the NJ ASK 2011 tests to the base scale.

(1) Calibrate the 2011 assessment without constraint

The first step in equating the NJ ASK 2011 tests to the base scale was to create data files for each test by grade and content area. These data were imported into Winsteps where an unconstrained or free calibration was conducted. This free calibration allowed Winsteps to calculate the 2011 Rasch values based strictly on how the examinees and items performed without regard to previous performance.

(2) Examine the stability of the common items

A set of items largely from the 2010 NJ ASK Operational tests calibrated to the base scale were selected as the potential anchor items for the NJ ASK 2011 Operational tests in LAL, mathematics, and science. These anchor items were internal – contributing to the students’ total score. These items were sound in statistical characteristics and representative of the test contents. Given that these tests were not released, these anchors can still be considered secure. The anchor sets included both multiple-choice and constructed response items. In mathematics, one to two short constructed response items were also included in the pool of anchor items.

A slightly different procedure was used for LAL in grades 3-5. A set of internal anchor items as described above was used. However, an additional external set of anchor items was also used in an equating methodology designated as Forward/Backward Equating. Equating is conducted twice - first using the internal anchor set as the *forward* component, followed by the external link as the *backward* component. The process concludes by averaging the Rasch values resulting from both the Forward and Backward equating procedures.

³³ Hambleton, R. K (1989). Principles and selected applications of item response theory. In R. L. Linn (Ed.), *Educational Measurement* (3rd ed.). Washington, DC: American Council on Education.

³⁴ Hambleton, R. K., & Swaminathan, H. (1985). *Item Response Theory. Principles and Applications*. Boston: Kluwer.

³⁵ Smith, Jr. E. V. (2004). Evidence for the reliability of measures and validity of measure interpretation: A Rasch measurement perspective. In E. V. Smith, Jr. & R. M. Smith, *Introduction to Rasch measurement: Theory, models and applications*. Maple Grove, MN: JAM Press.

³⁶ Hambleton, R. K., Swaminathan, H. & Rogers, H. J. (1991). *Fundamentals of Items Response Theory*. Newbury Park, CA: Sage Publications.

³⁷ van der Linden, W. J. & Hambleton, R. K. (1997). *Handbook of Modern Item Response Theory*. New York: Springer-verlag Verlag.

Assessing the stability of the common items was accomplished through comparing the constrained Rasch values from prior usage with the unconstrained 2011 Rasch values of the common items for all content area and grade combinations. The stability of common items refers to the expectation that common items function the same way for the groups involved in an equating study. It is recommended that the stability of common items be examined visually and statistically (Kolen and Brennan, 2004)³⁸. In the NJ ASK 2011 anchor evaluation, both visual and analytical methods were applied. Anchor items were evaluated using both the 0.3 Criterion and the Delta Plot. In order for an anchor item to be considered for removal from the anchor set, the absolute logit difference between the adjusted 2011 “free” calibrations and the 2010 “base” calibrations has to be greater than 0.3 logits (Miller, Rotou, & Twing. 2004)³⁹ and more than two standard deviations away from the line of best fit fitted to the base year and current year normalized inverse p-values in the delta plot. Figures 7.2.1 to 7.2.34 present scatter plots by content area and grade that were used for visual examination. Tables supporting the analytical examination are presented in the appendices of the 2011 Equating Report, Equating of NJ ASK Regular, Braille, Large Print, and Alternate Test Forms.

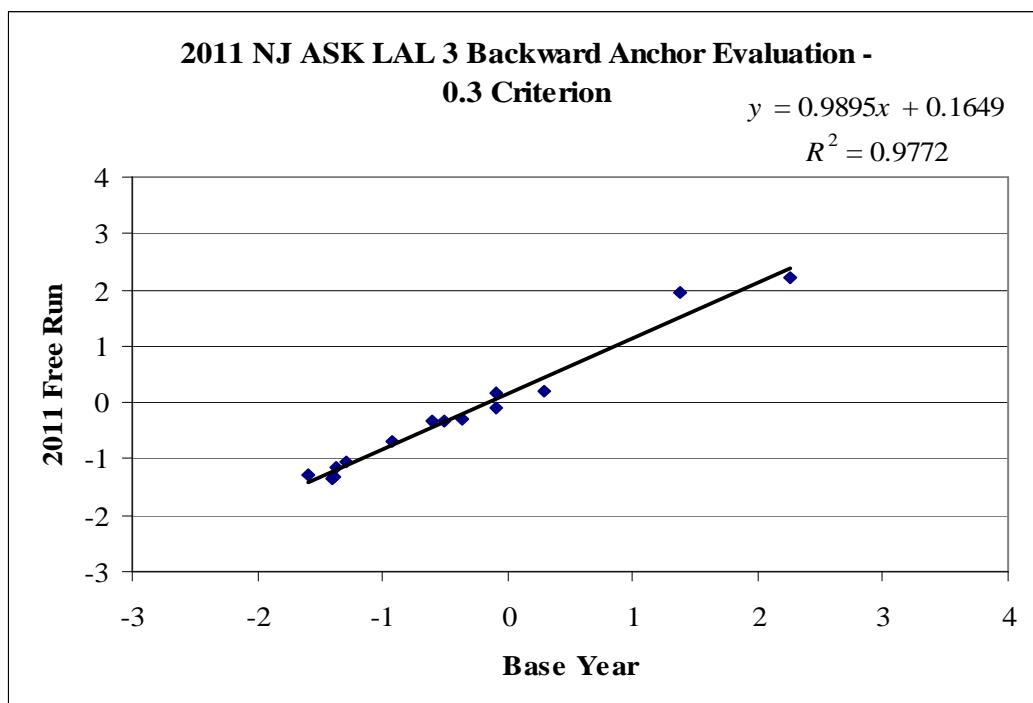


Figure 7.2.1: Scatter Plot of Anchor Items - LAL Grade 3 Backward

³⁸ Kolen, M. J., & Brennan, R. L. (2004). *Test equating: Methods and practice*. NY: Springer.

³⁹ Miller, G.E., Rotou, O., & Twing, J.S. (2004). Evaluation of the 0.3 logits screening criterion in common item equating. *Journal of Applied Measurement*, 5(2), 172-177.

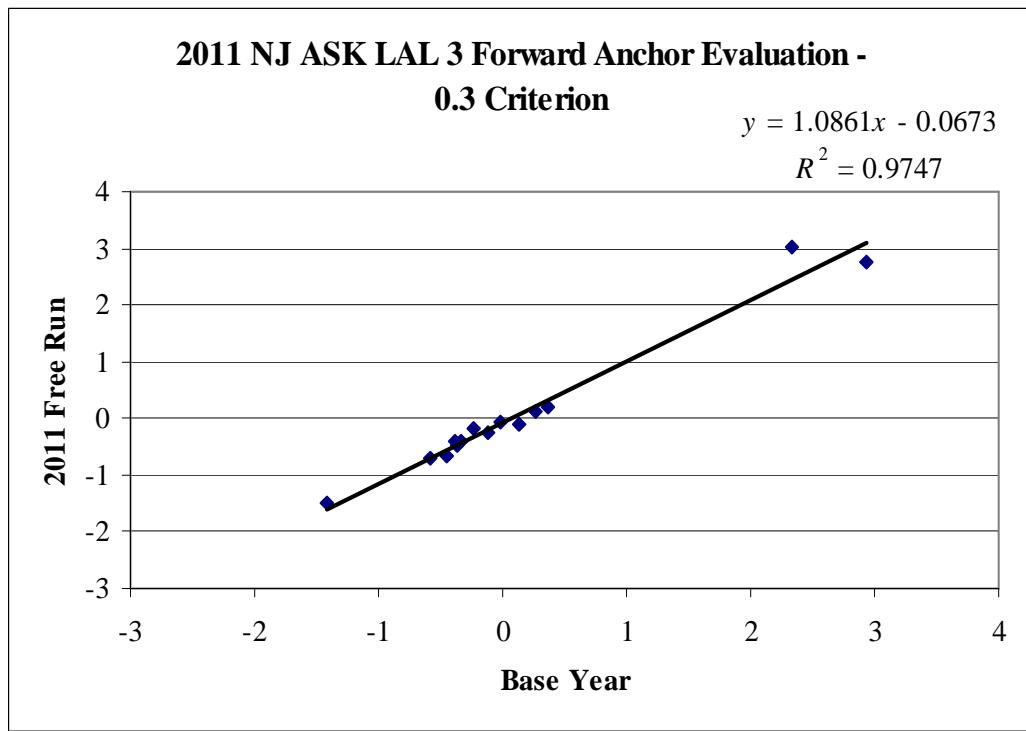


Figure 7.2.2: Scatter Plot of Anchor Items - LAL Grade 3 Forward

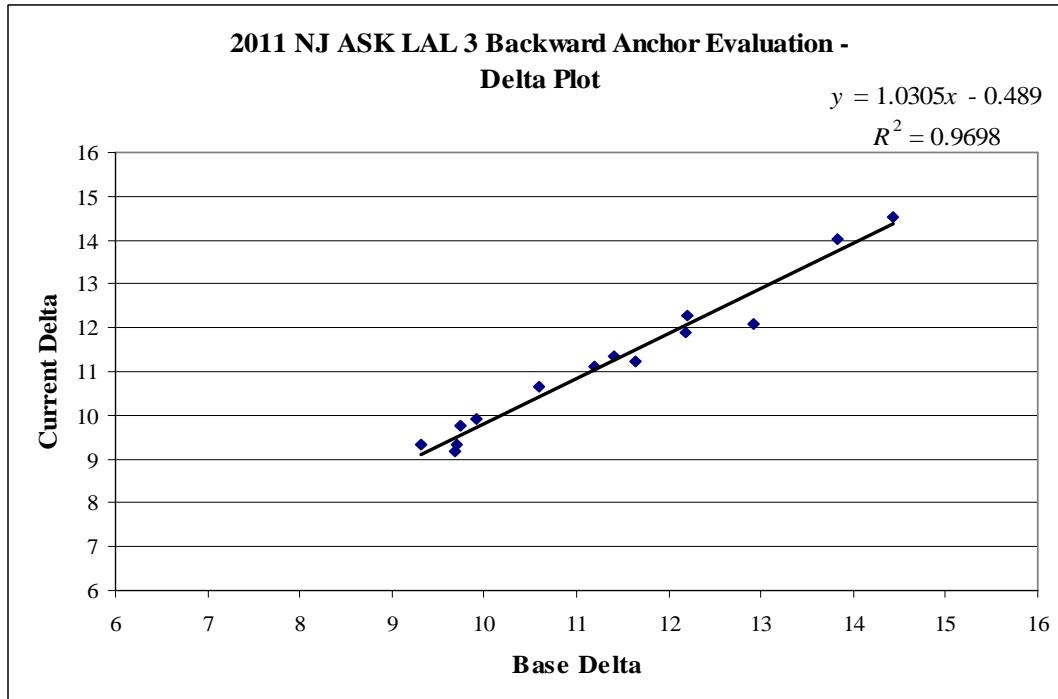


Figure 7.2.3: Scatter Plot of Anchor Items - LAL Grade 3 Delta Plot - Backward

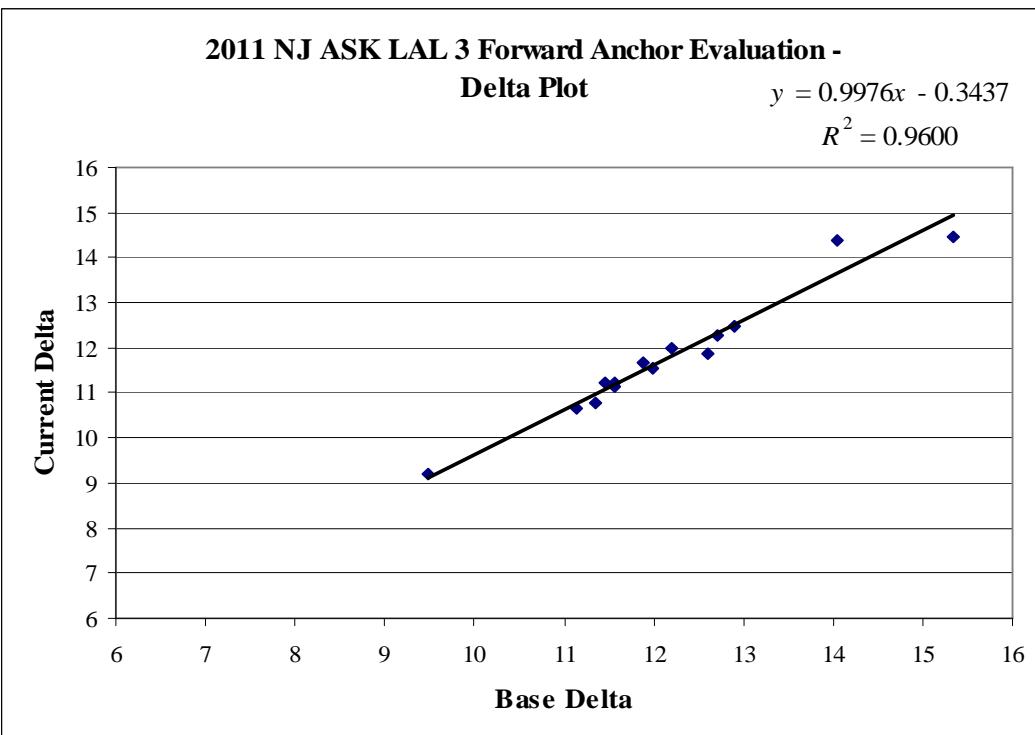


Figure 7.2.4: Scatter Plot of Anchor Items - LAL Grade 3 Delta Plot - Forward

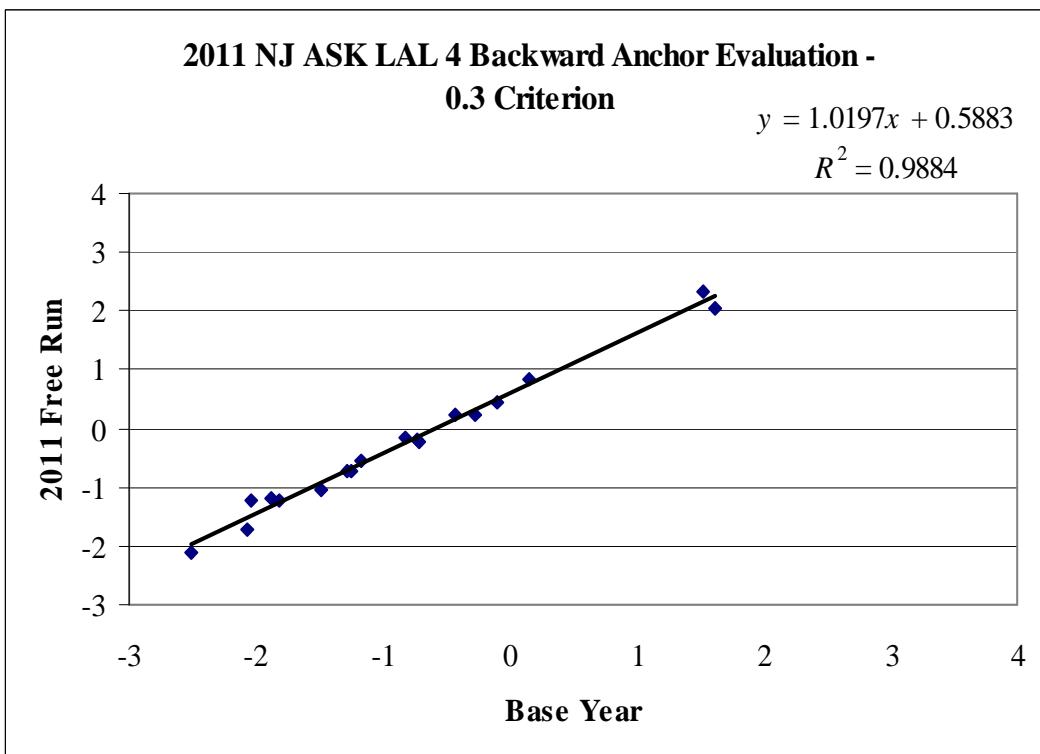


Figure 7.2.5: Scatter Plot of Anchor Items - LAL Grade 4 Backward

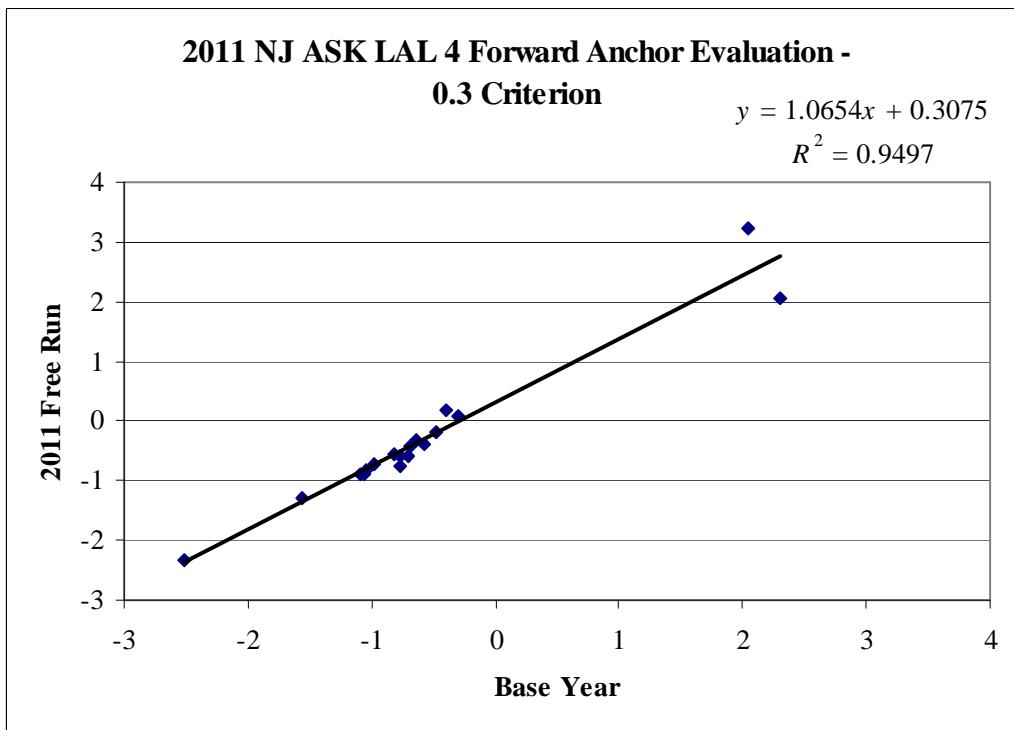


Figure 7.2.6: Scatter Plot of Anchor Items - LAL Grade 4 Forward

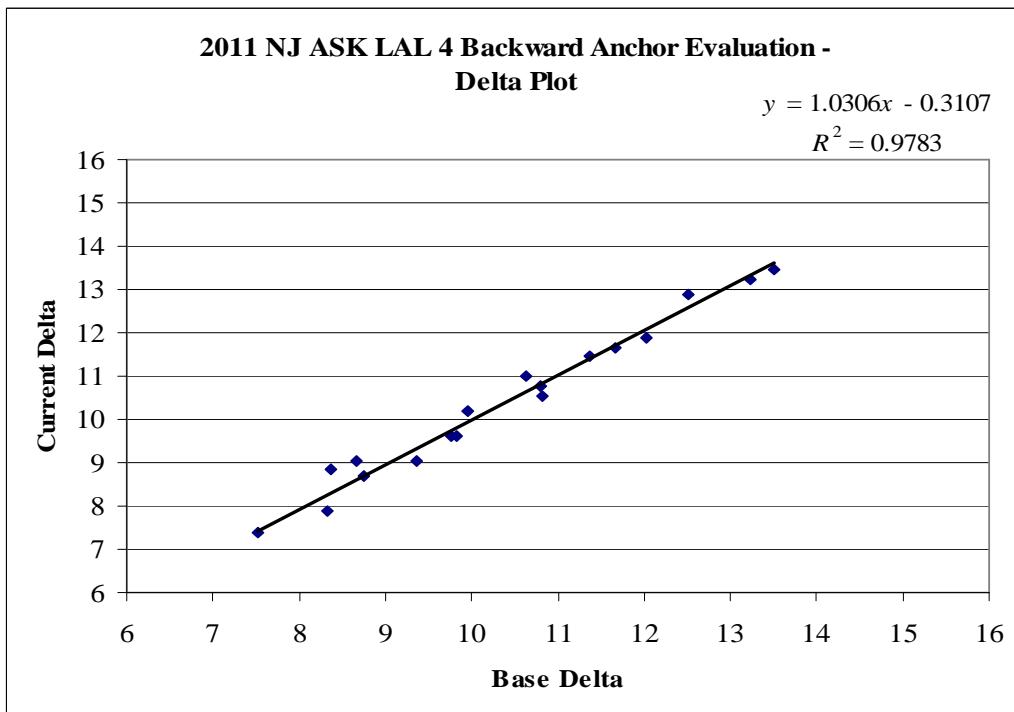


Figure 7.2.7: Scatter Plot of Anchor Items - LAL Grade 4 Delta Plot – Backward

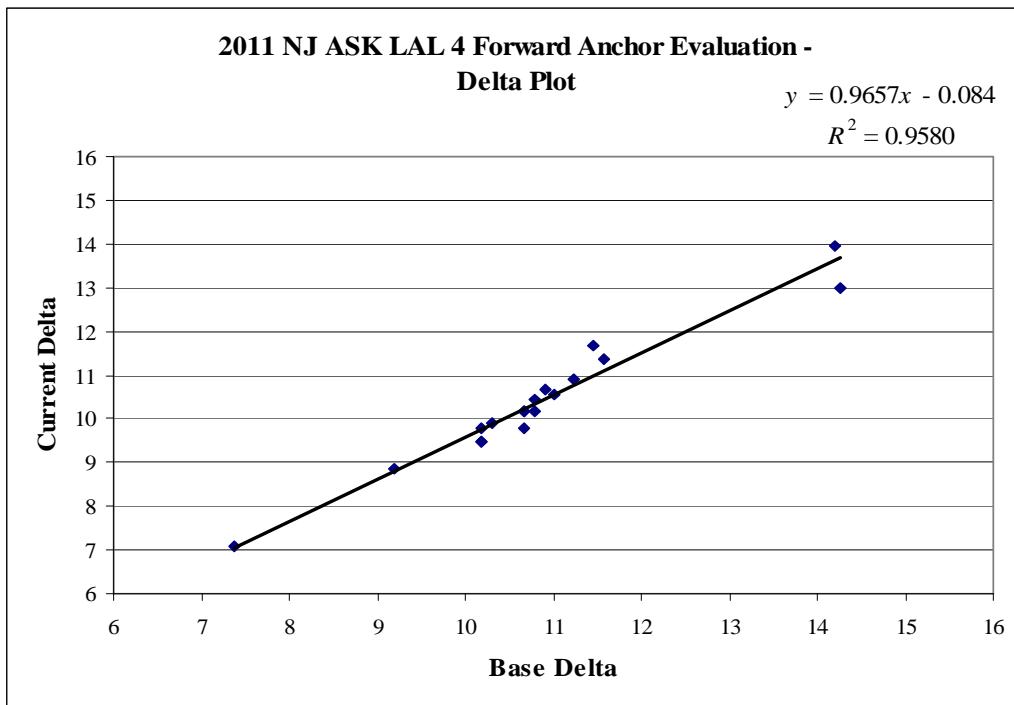


Figure 7.2.8: Scatter Plot of Anchor Items - LAL Grade 4 Delta Plot – Forward

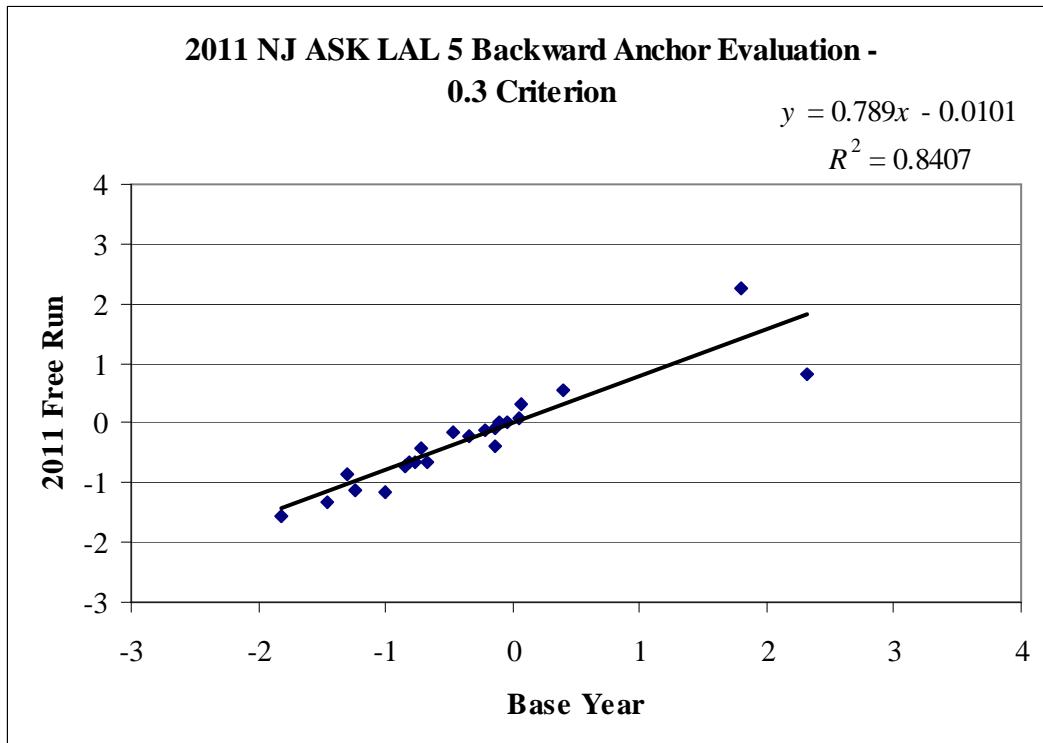


Figure 7.2.9: Scatter Plot of Anchor Items - LAL Grade 5 Backward

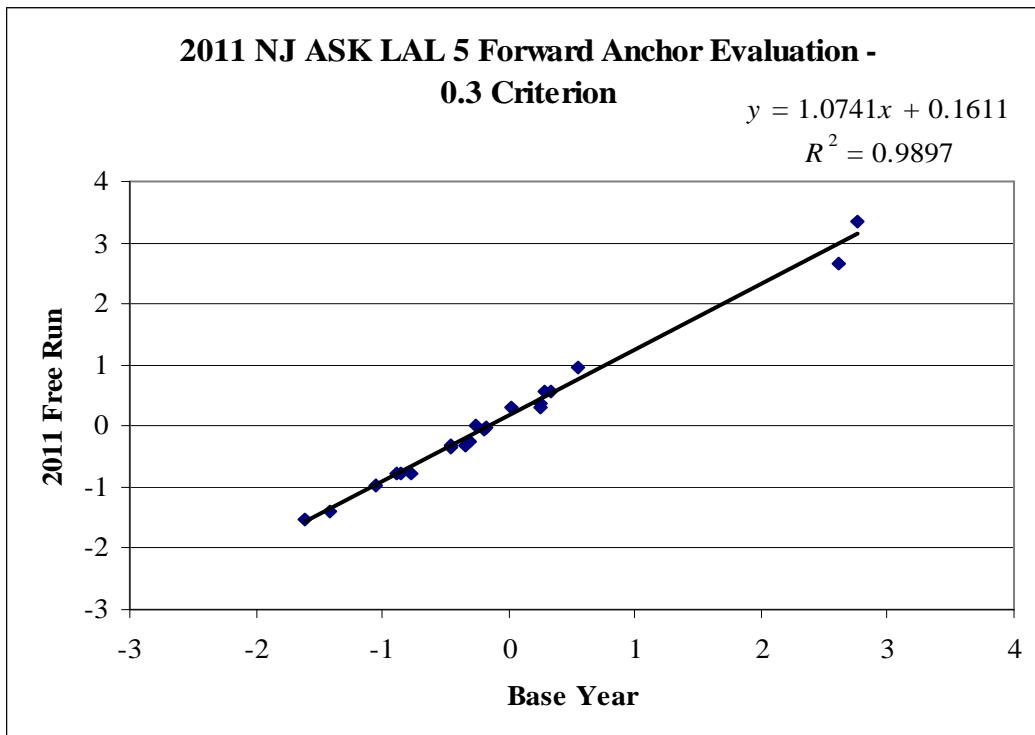


Figure 7.2.10: Scatter Plot of Anchor Items - LAL Grade 5 Forward

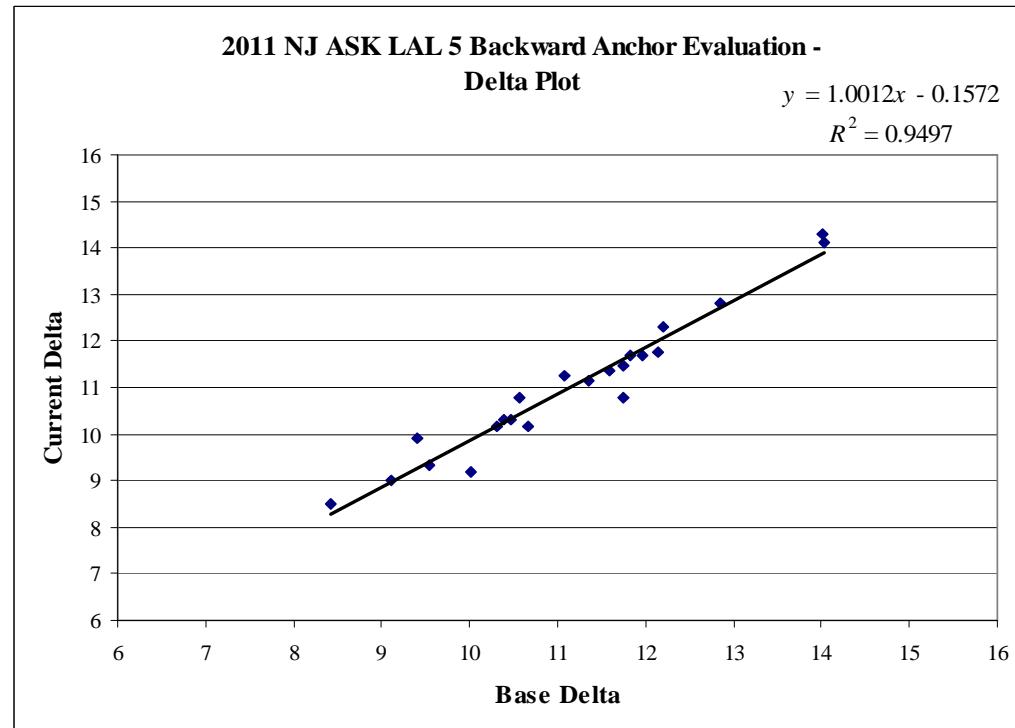


Figure 7.2.11: Scatter Plot of Anchor Items - LAL Grade 5 Delta Plot - Backward

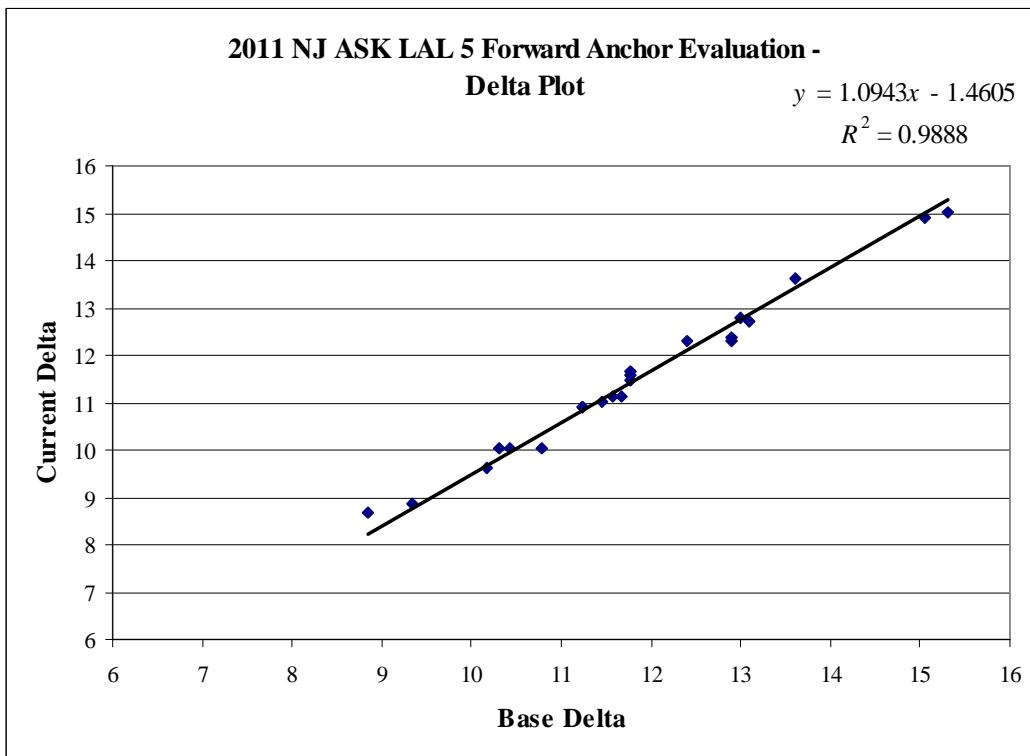


Figure 7.2.12: Scatter Plot of Anchor Items - LAL Grade 5 Delta Plot – Forward

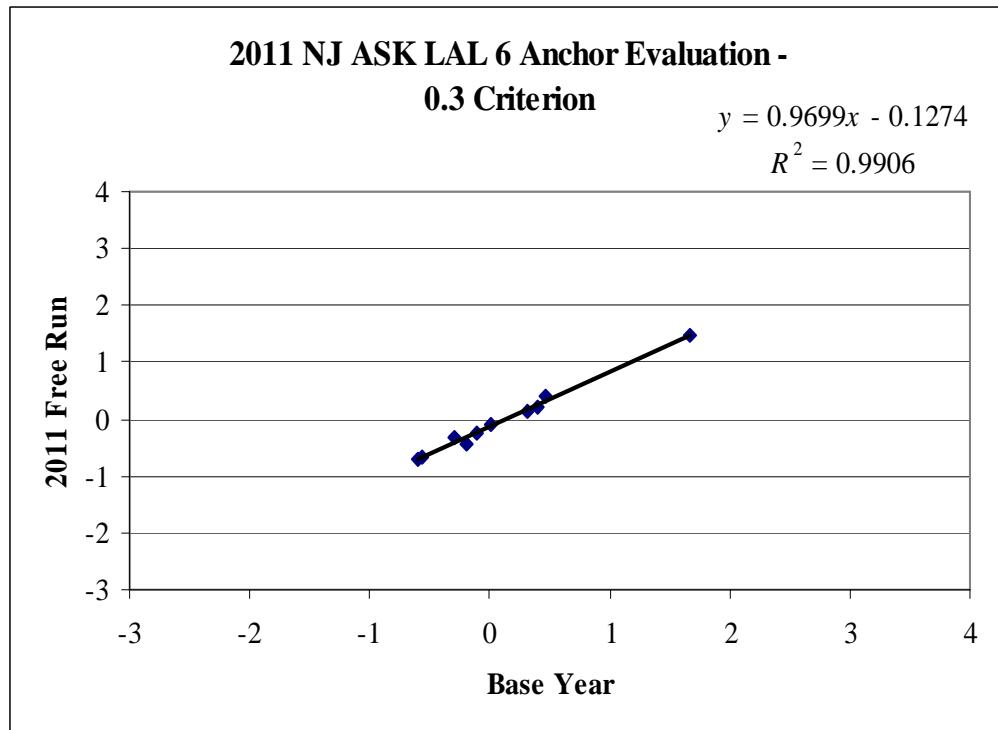


Figure 7.2.13: Scatter Plot of Anchor Items - LAL Grade 6

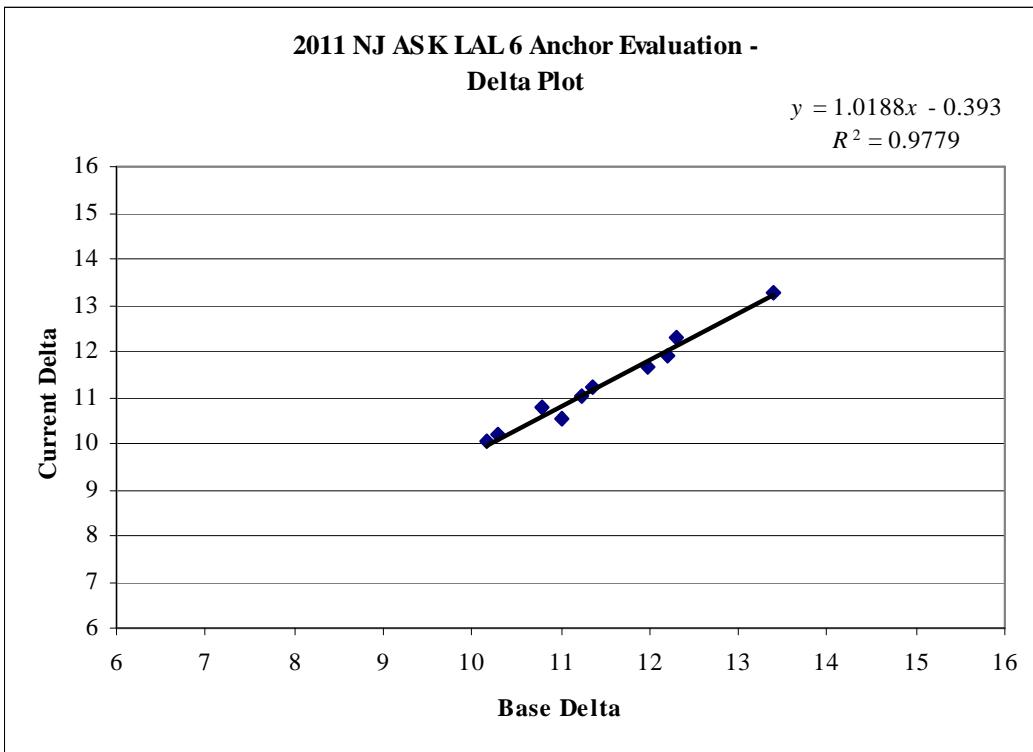


Figure 7.2.14: Scatter Plot of Anchor Items - LAL Grade 6 Delta Plot

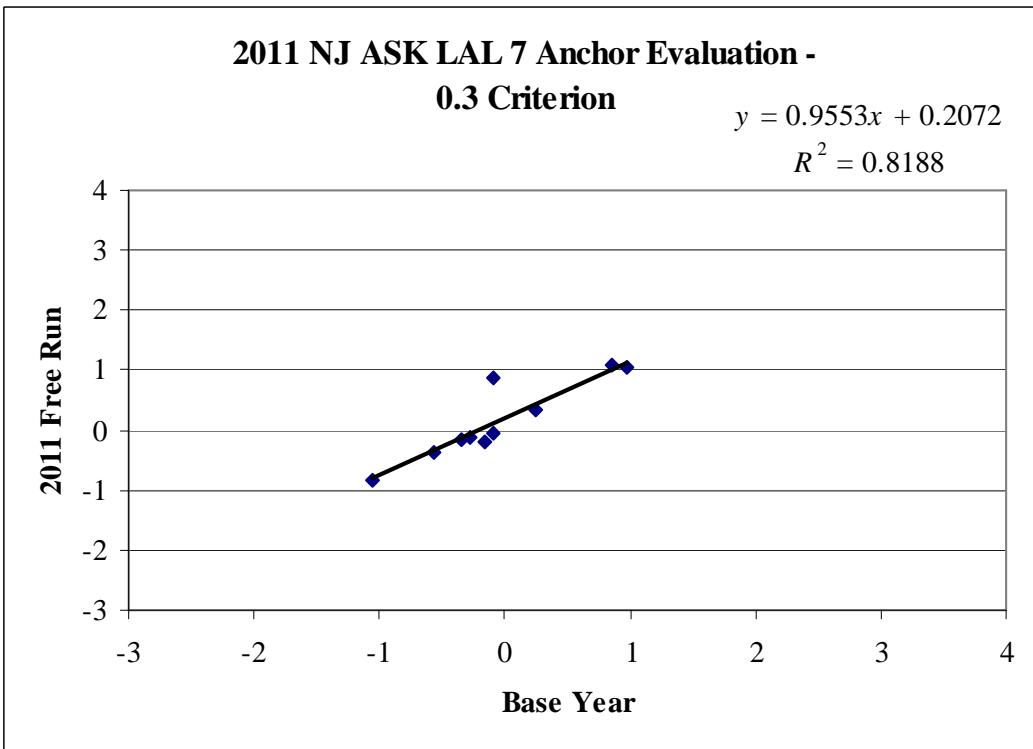


Figure 7.2.15: Scatter Plot of Anchor Items - LAL Grade 7

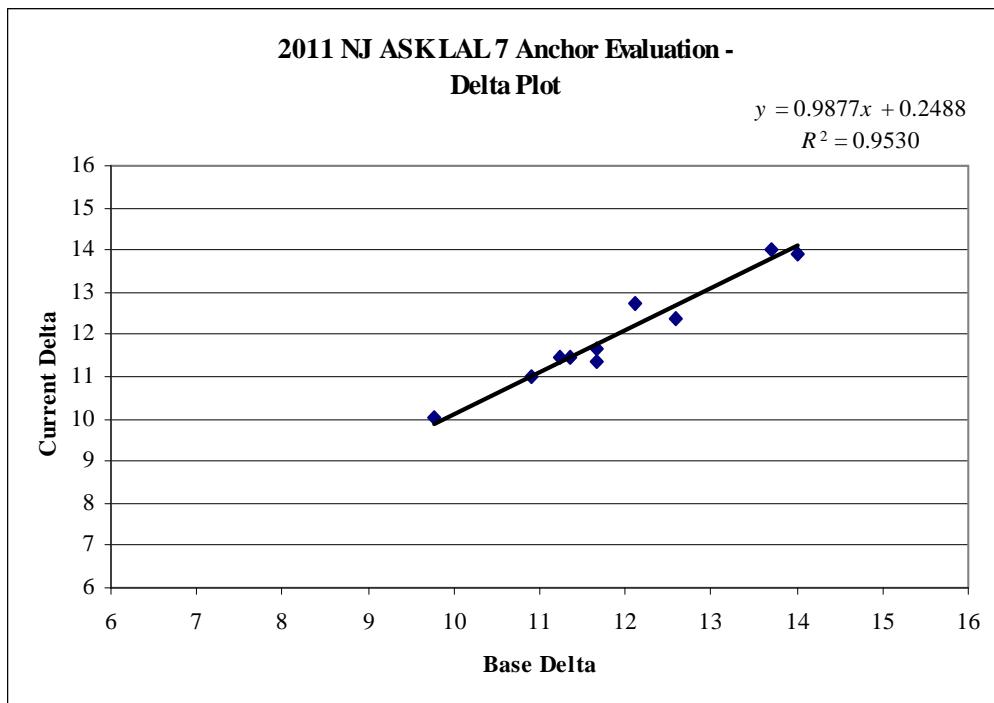


Figure 7.2.16: Scatter Plot of Anchor Items - LAL Grade 7 Delta Plot

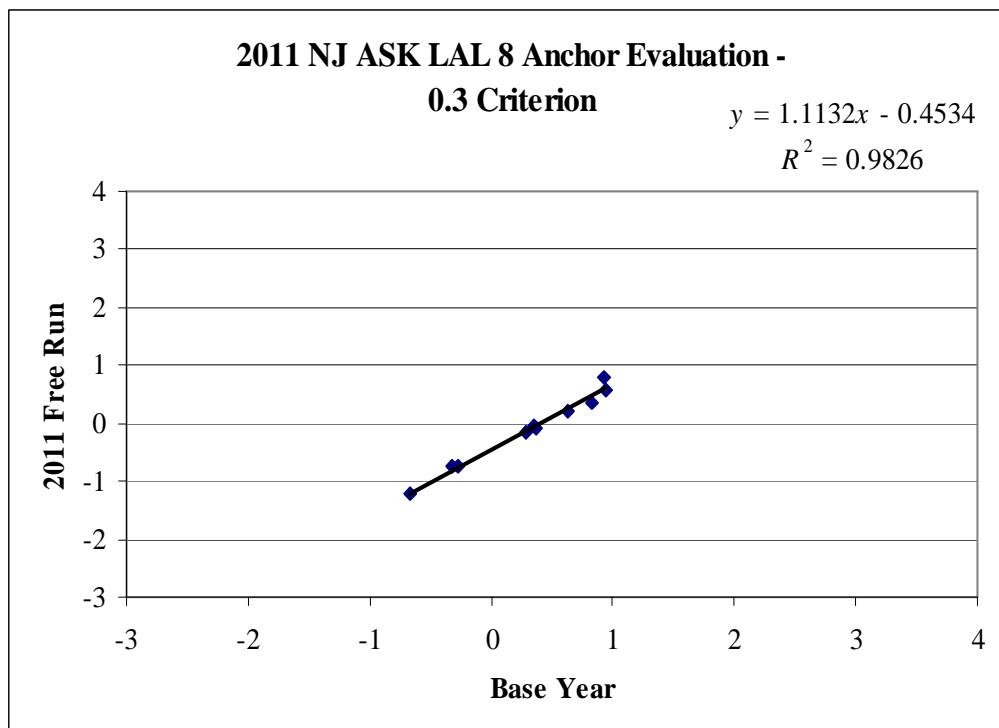


Figure 7.2.17: Scatter Plot of Anchor Items - LAL Grade 8

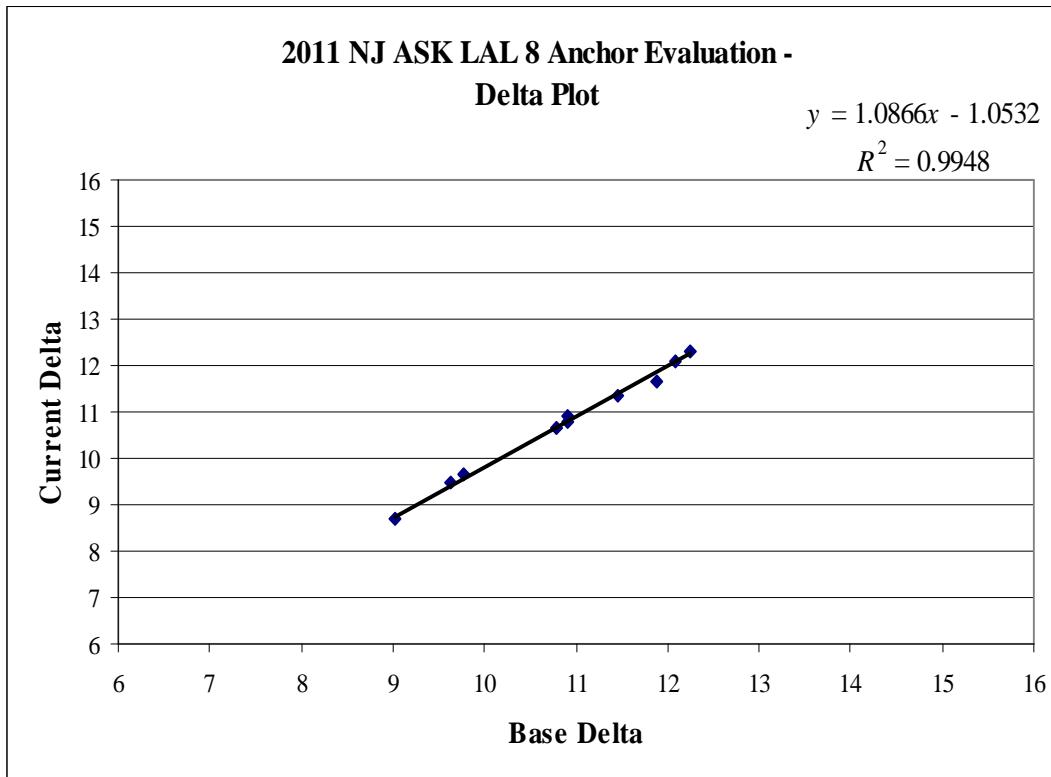


Figure 7.2.18: Scatter Plot of Anchor Items - LAL Grade 8 Delta Plot

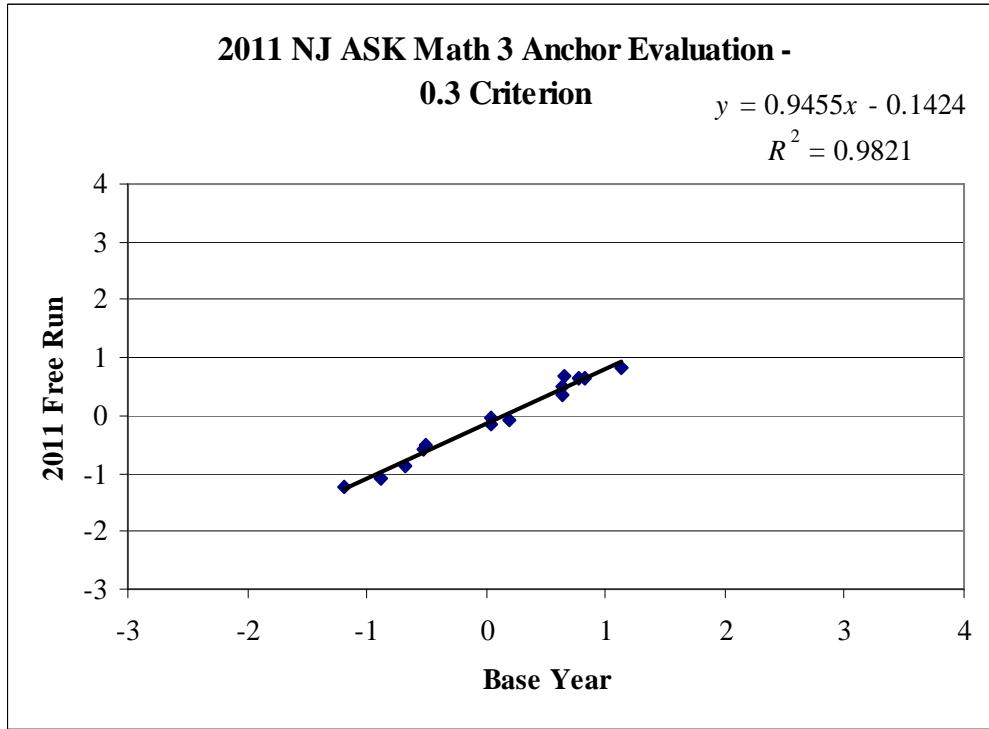


Figure 7.2.19: Scatter Plot of Anchor Items - Mathematics Grade 3

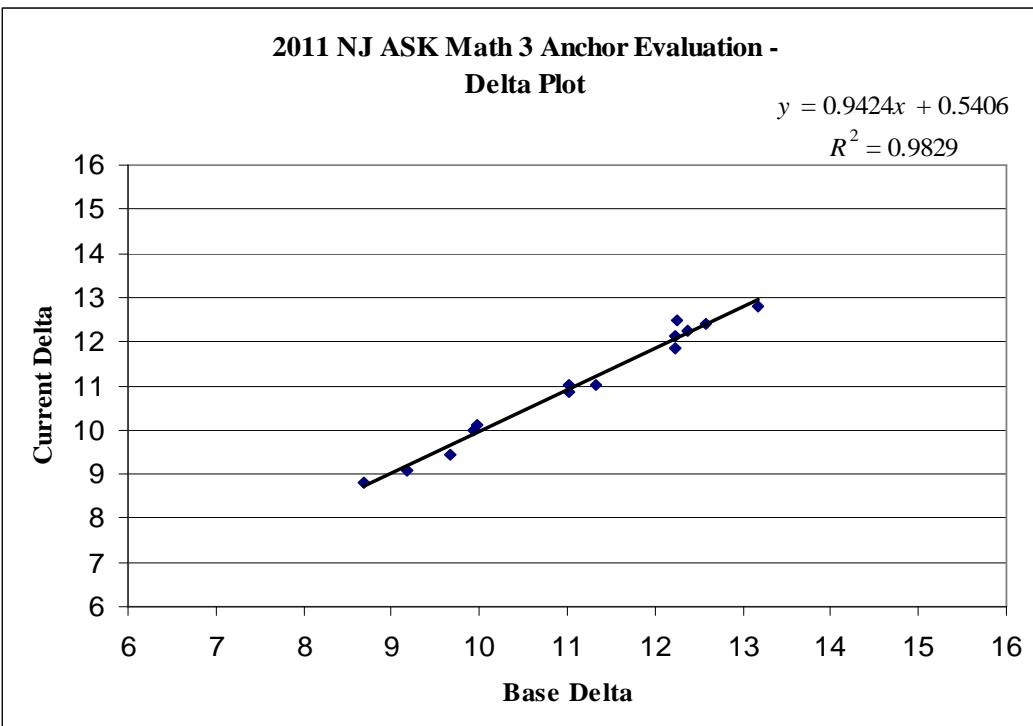


Figure 7.2.20: Scatter Plot of Anchor Items - Mathematics Grade 3 Delta Plot

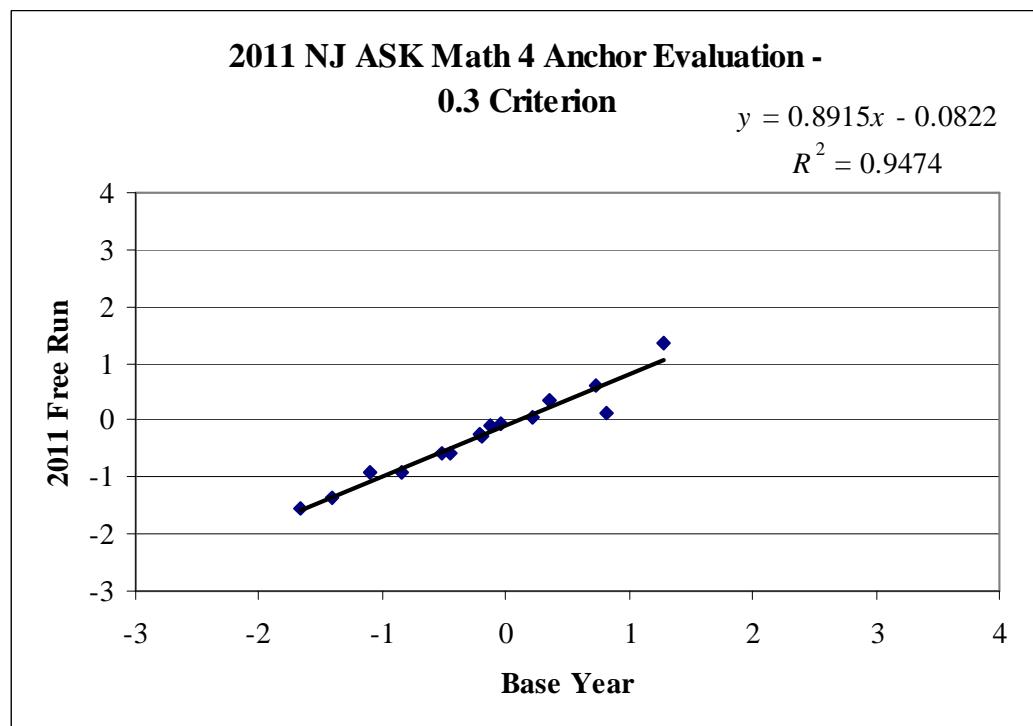


Figure 7.2.21: Scatter Plot of Anchor Items - Mathematics Grade 4

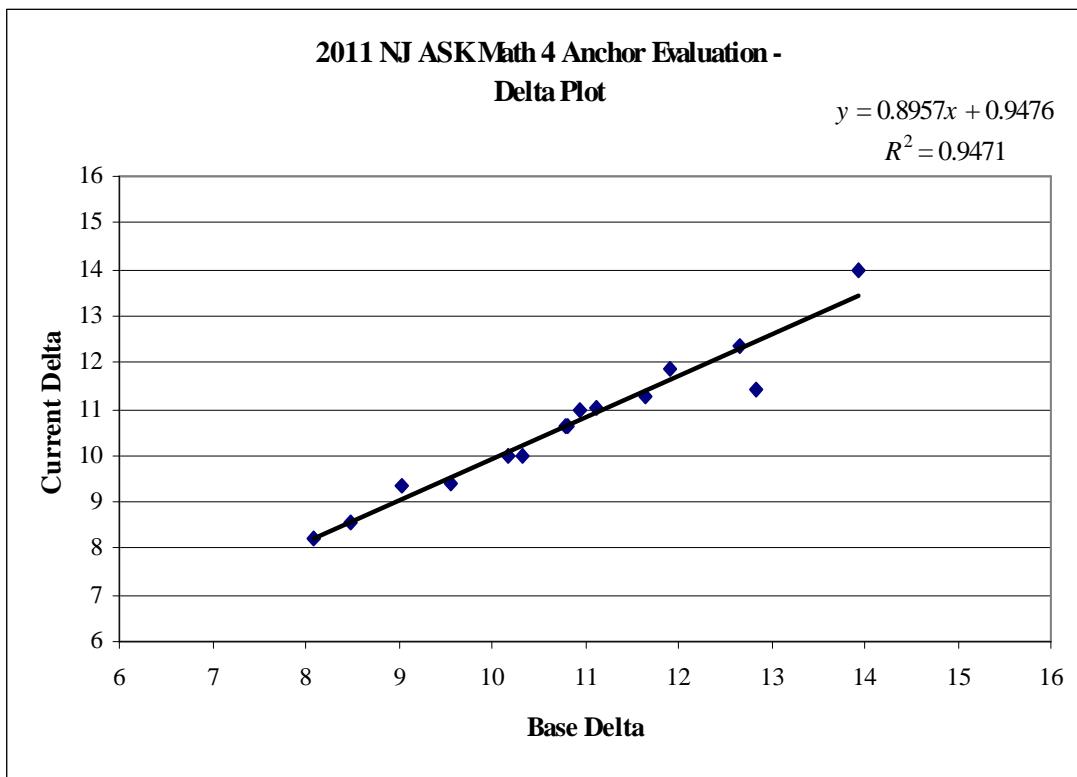


Figure 7.2.22: Scatter Plot of Anchor Items - Mathematics Grade 4 Delta Plot

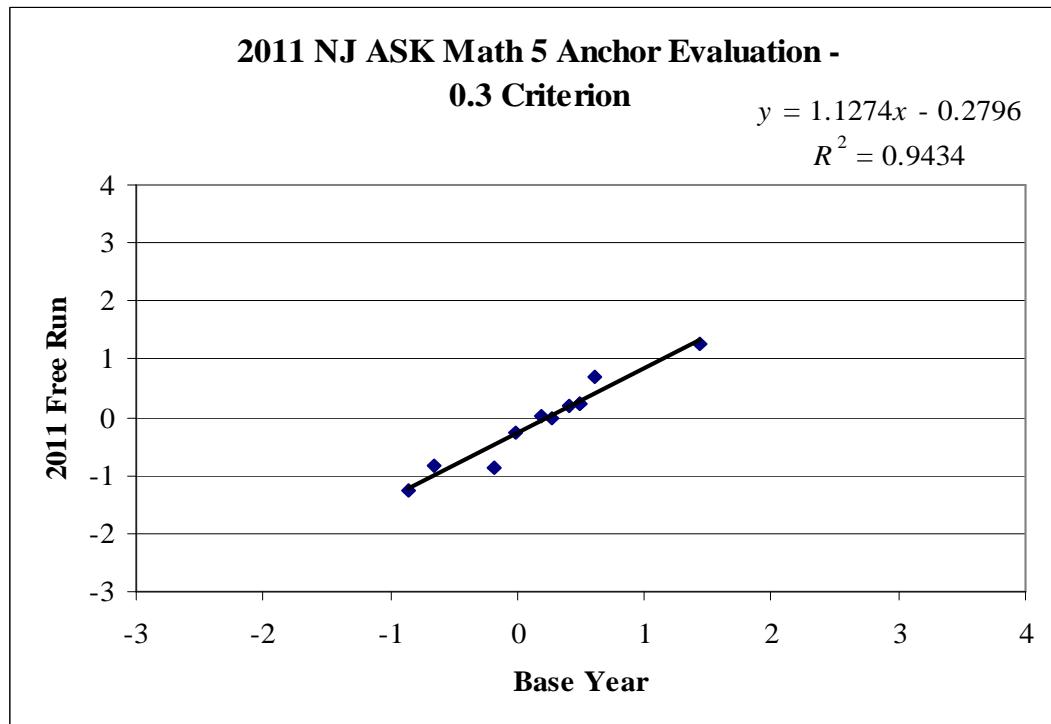


Figure 7.2.23: Scatter Plot of Anchor Items - Mathematics Grade 5

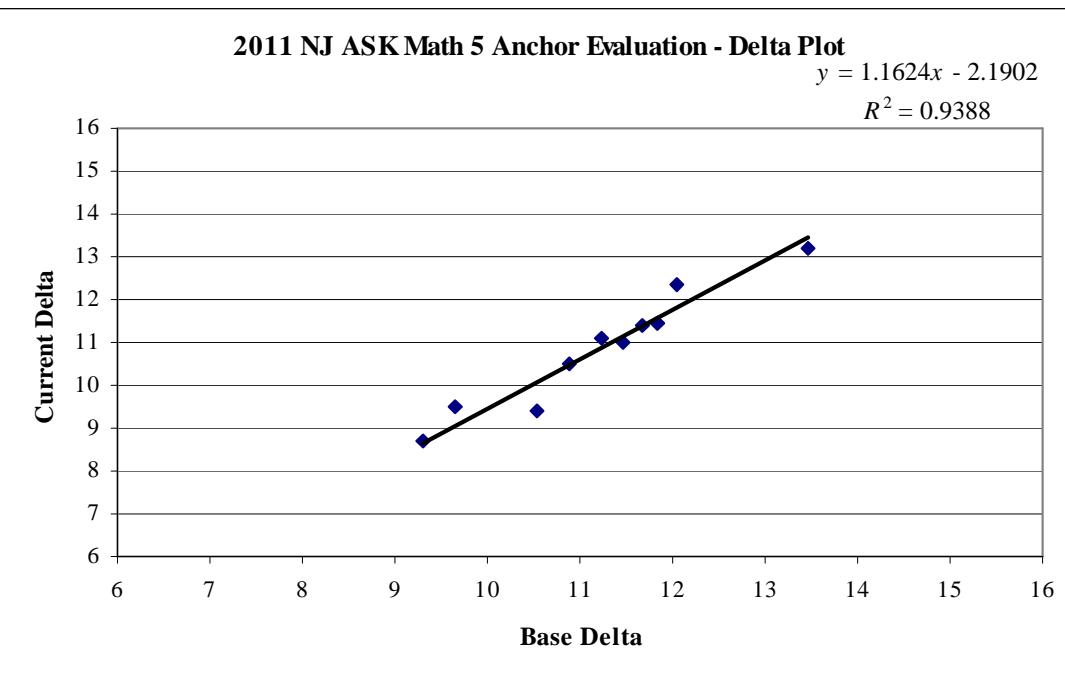


Figure 7.2.24: Scatter Plot of Anchor Items - Mathematics Grade 5 Delta Plot

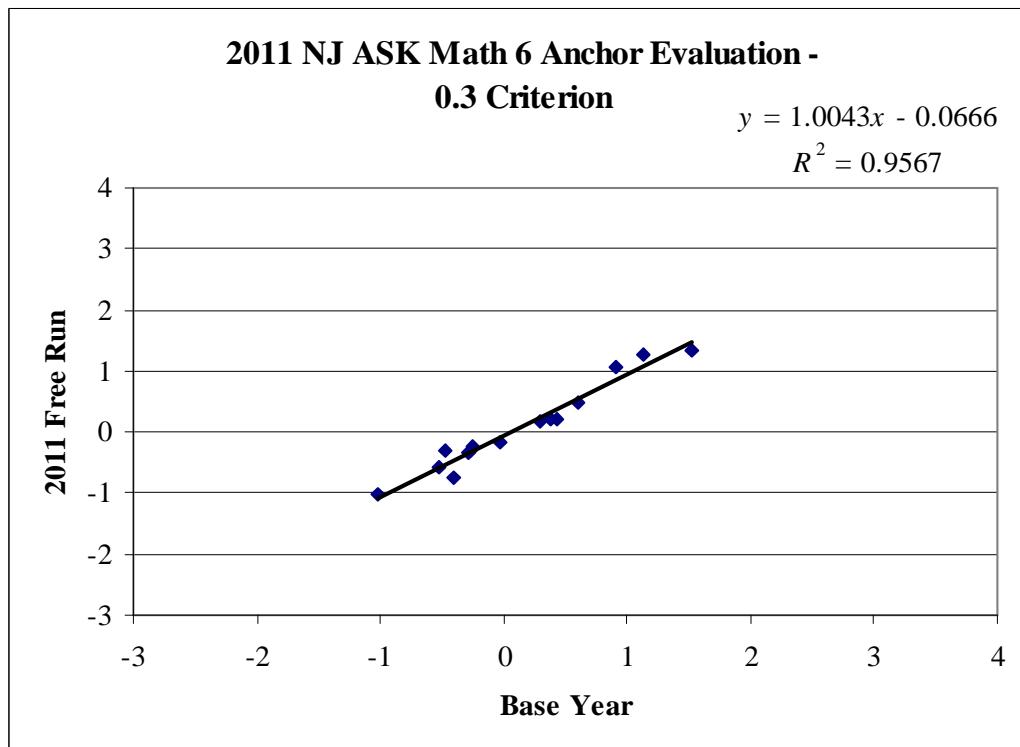


Figure 7.2.25: Scatter Plot of Anchor Items - Mathematics Grade 6

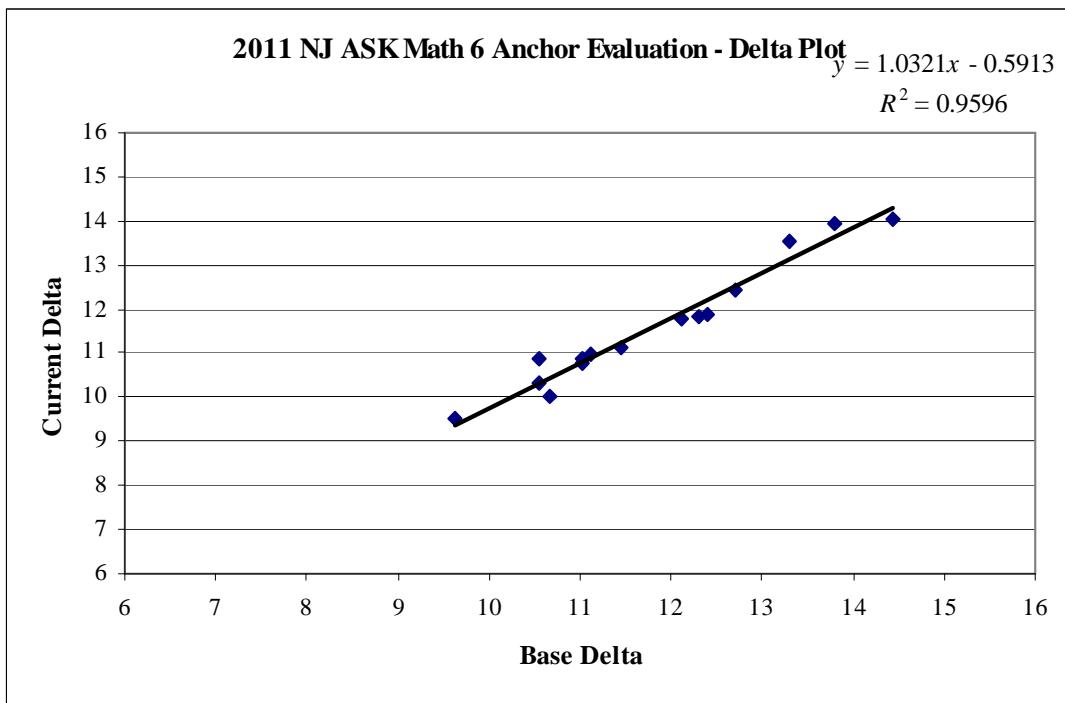


Figure 7.2.26: Scatter Plot of Anchor Items - Mathematics Grade 6 Delta Plot

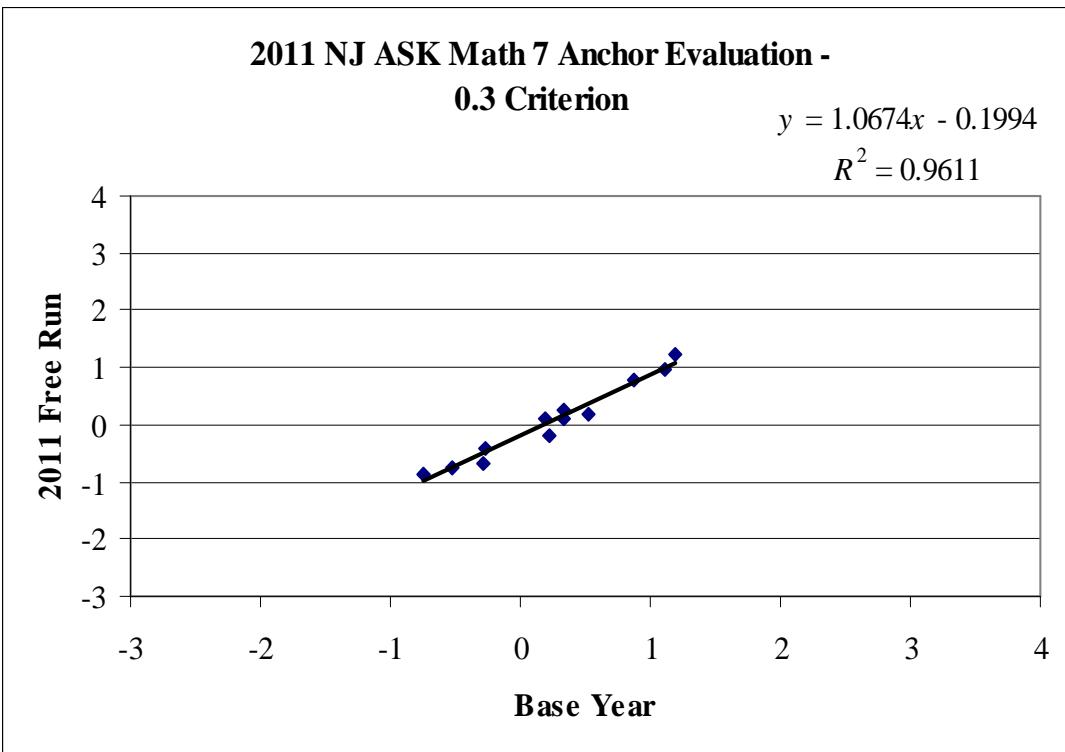


Figure 7.2.27: Scatter Plot of Anchor Items - Mathematics Grade 7

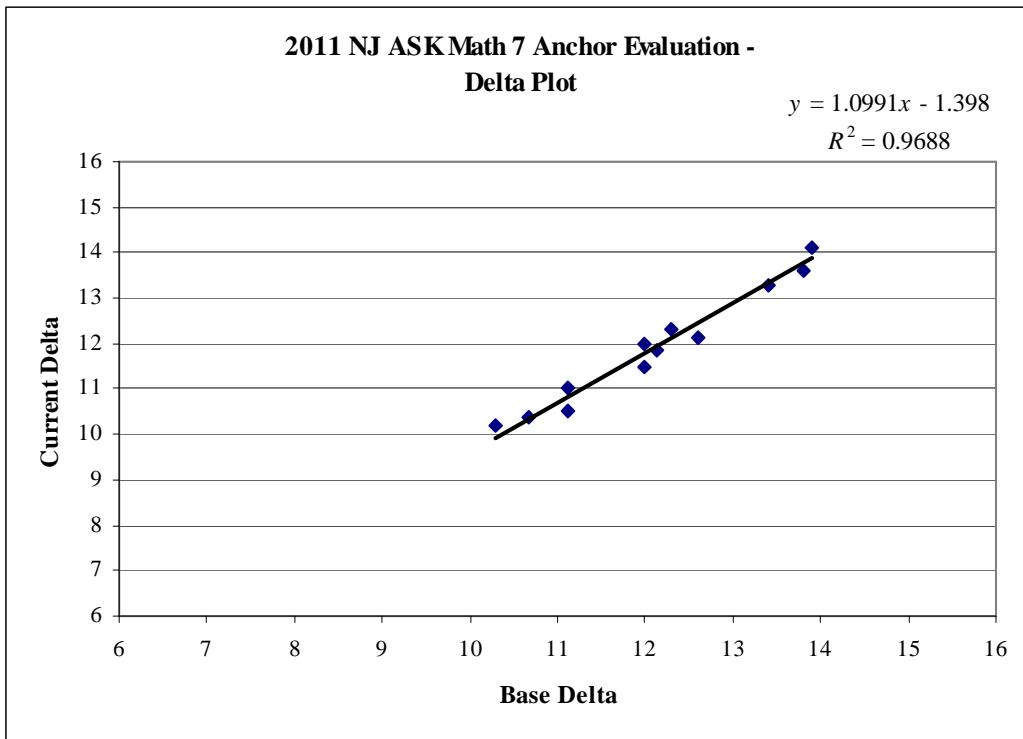


Figure 7.2.28: Scatter Plot of Anchor Items - Mathematics Grade 7 Delta Plot

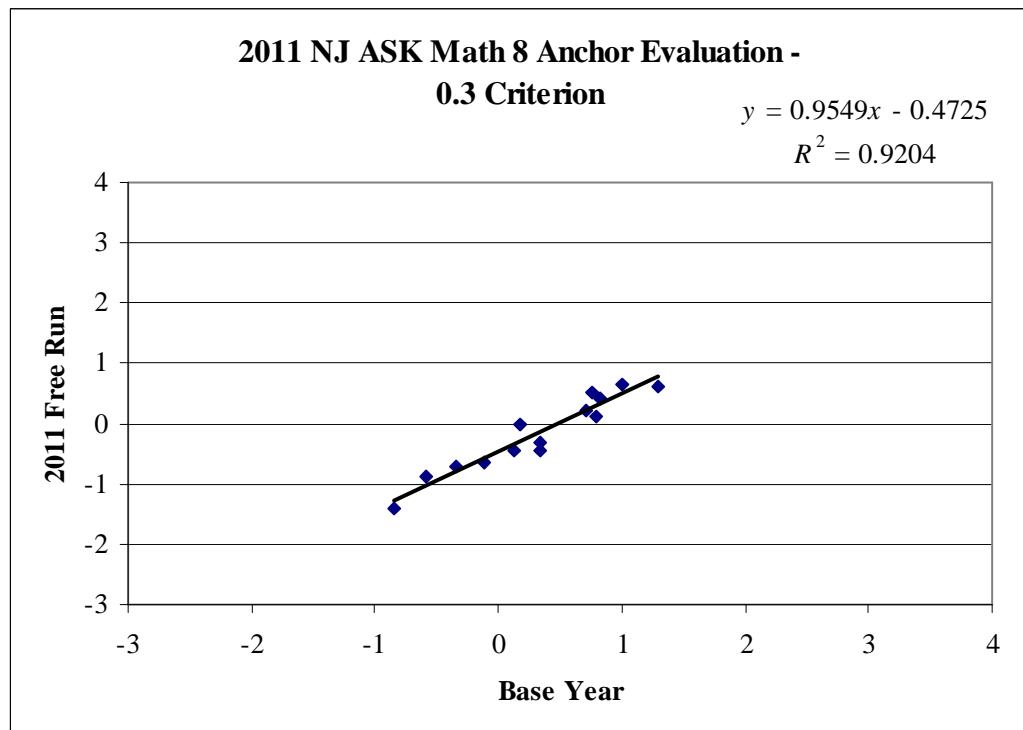


Figure 7.2.29: Scatter Plot of Anchor Items - Mathematics Grade 8

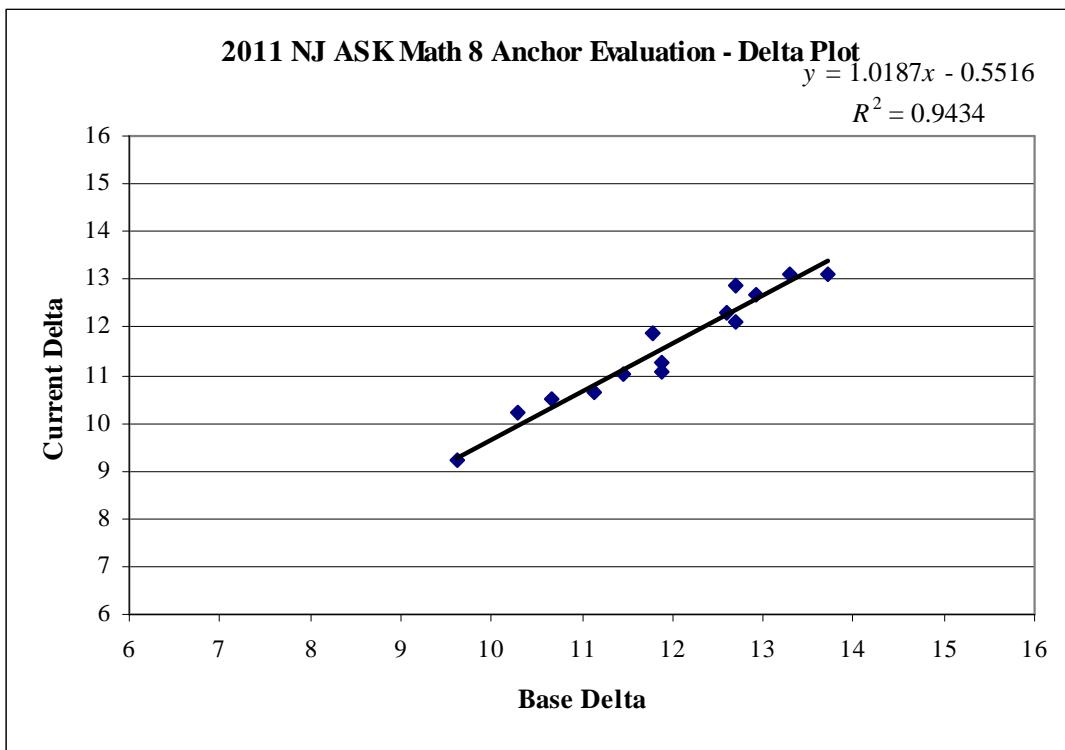


Figure 7.2.30: Scatter Plot of Anchor Items - Mathematics Grade 8 Delta Plot

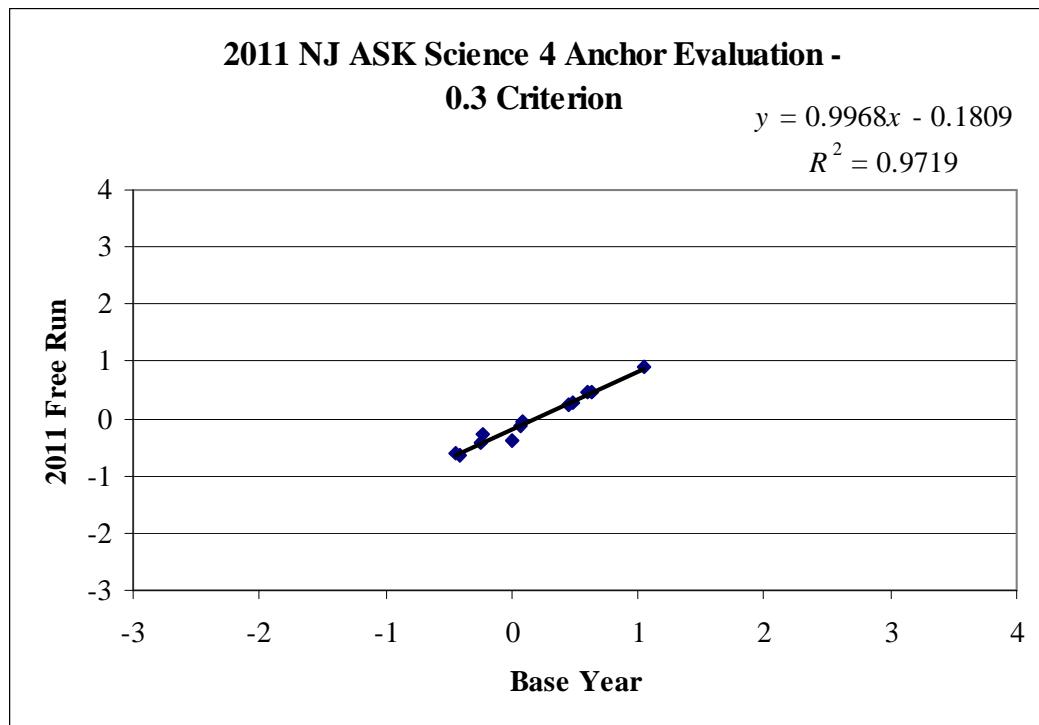


Figure 7.2.31: Scatter Plot of Anchor Items - Science Grade 4

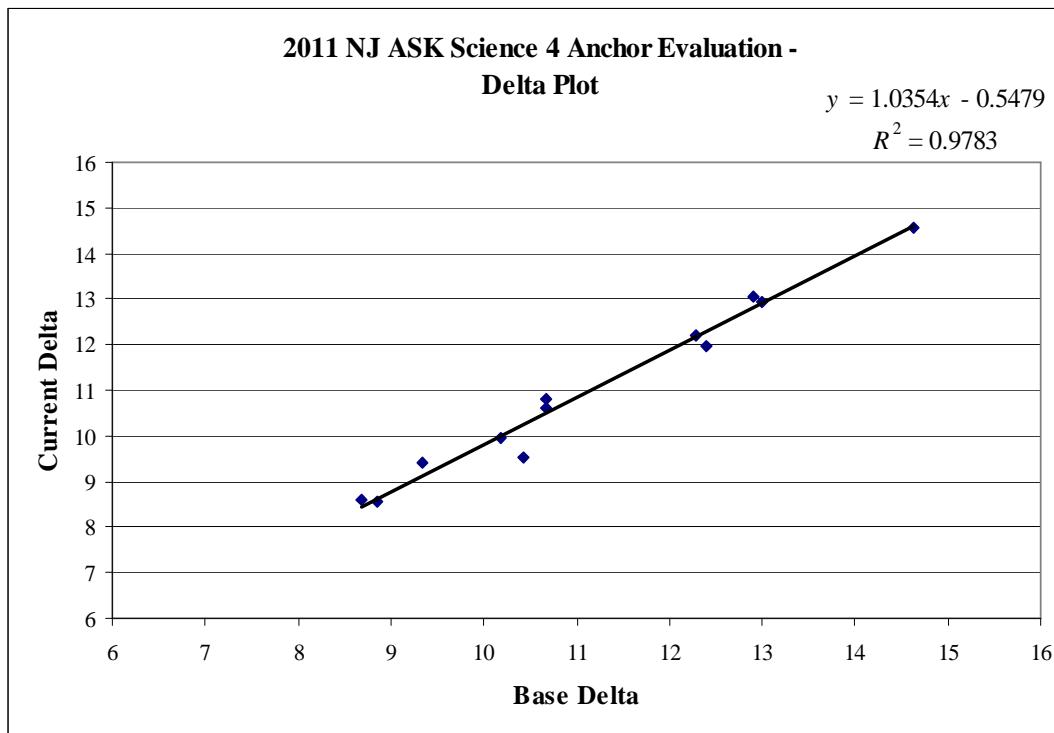


Figure 7.2.32: Scatter Plot of Anchor Items - Science Grade 4 Delta Plot

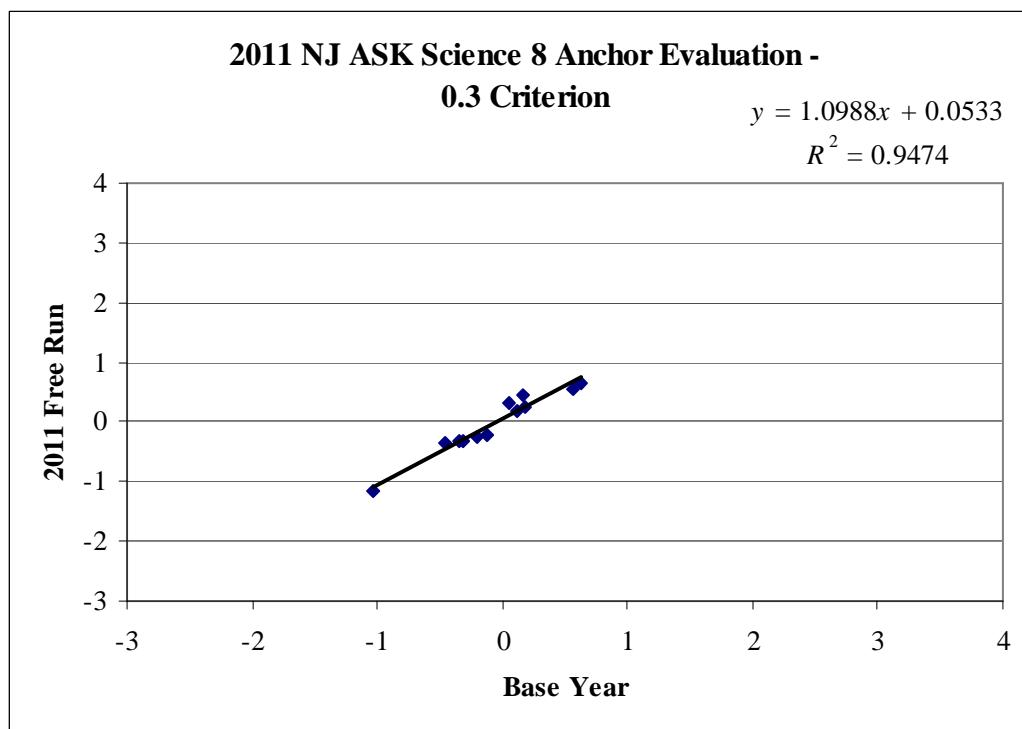


Figure 7.2.33: Scatter Plot of Anchor Items - Science Grade 8

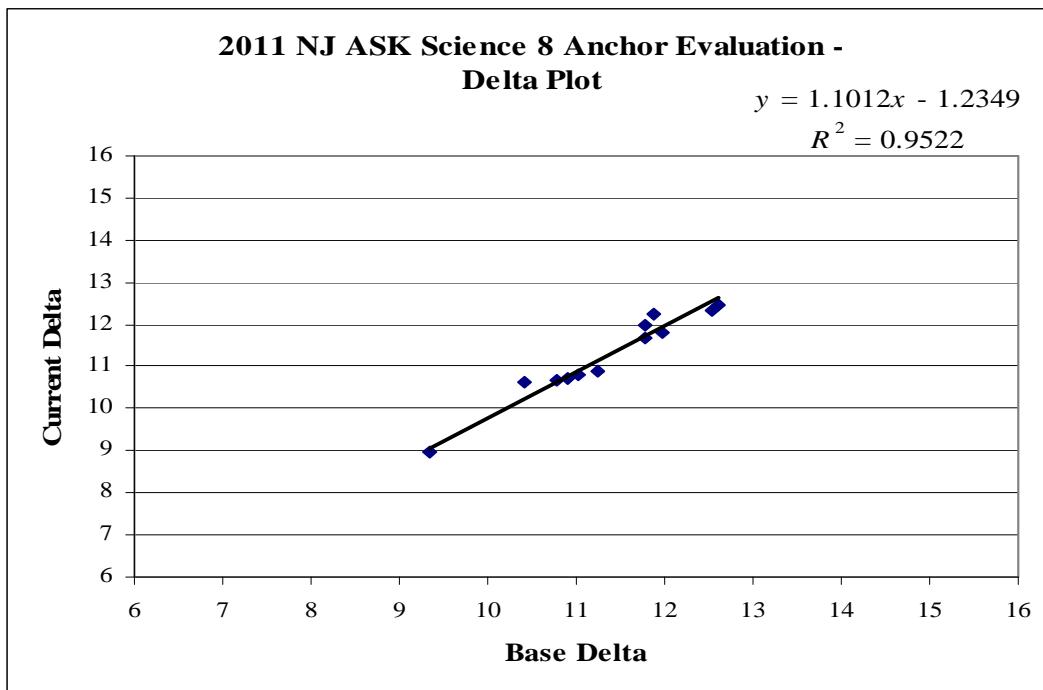


Figure 7.2.34: Scatter Plot of Anchor Items - Science Grade 8 Delta Plot

(3) Equate the 2011 assessments to the “base” scale

It was assumed that the latent traits measured by the 2011 operational tests and the “base” tests were the same. Note that all anchor items for 2011 operational assessments were selected from previous administrations where the items were already calibrated to the base scale. Given the fact that common anchor items were used and the blueprint and item specifications were the same, it appears reasonable to assume that the underlying latent trait or construct measured by each assessment was the same. To equate the 2011 assessments to the “base” scale, the Rasch values (difficulties and Rasch-Anderich thresholds for the open-ended items) of the common items were fixed to the “base” scale. This resulted in a raw score to theta conversion on the “base” scale for the 2011 assessment (i.e., the 2011 assessments were scaled to the “base” metric).

(4) Assess the model fit

Winsteps was able to produce an ability estimate (theta) for every possible number correct, raw score total as one or more examinees obtained a perfect score on each CR item in LAL, mathematics, and science. Table 7.1.1 shows the number of examinees used for the calibrations by grade and content area.

Tables 7.2.15 – 7.2.17 summarizes Infit and Outfit statistics for the NJ ASK 2011 tests. The Infit statistic is more sensitive to unexpected behavior affecting responses near an examinee’s ability level while the Outfit statistic is more sensitive to unexpected behavior by examinees far from their ability level (see Winsteps Manual, pp.199-202). Infit and Outfit can be expressed as a mean square (MNSQ) statistic or on a standardized metric (ZSTD). MNSQ values are more oriented

toward practical significance, whereas Z values are more closely related to statistical significance. As a rule of thumb, the Rasch model fits the data well when the item mean square (“Infit”) indices are within the range of 0.70 to 1.30. The tables indicate that the majority of Infit indices are in the range of 0.70 to 1.30. The Infit statistics for all grades of LAL and science are within the recommended range. The Infit indices for one or more items in mathematics grades 3 and 4 are above the upper limit at 1.5. With the exception noted above the Rasch model fits the data very well with an average Infit of approximately 1.0.

Table 7.2.1: LAL - Summary of the Infit and Outfit Statistics by Grade

	Measure	INFIT		OUTFIT	
		Model Error	MNSQ	ZSTD	MNSQ
LAL 3	Mean	0.05	0.01	1.02	1.54
	SD	1.25	0.00	0.11	8.06
	Max	3.06	0.02	1.24	9.90
	Min	-1.59	0.00	0.11	-9.90
LAL 4	Mean	-0.27	0.01	1.00	-0.01
	SD	1.16	0.00	0.12	8.39
	Max	2.35	0.02	1.27	9.90
	Min	-2.73	0.01	0.76	-9.90
LAL 5	Mean	-0.01	0.01	0.98	-2.33
	SD	1.00	0.00	0.10	8.28
	Max	2.95	0.02	1.22	9.90
	Min	-1.67	0.01	0.78	-9.90
LAL 6	Mean	0.11	0.01	1.00	-0.45
	SD	0.70	0.00	0.09	7.82
	Max	1.67	0.02	1.20	9.90
	Min	-1.20	0.00	0.83	-9.90
LAL 7	Mean	-0.23	0.01	0.99	-0.76
	SD	0.70	0.00	0.09	8.31
	Max	1.02	0.02	1.20	9.90
	Min	-2.24	0.00	0.79	-9.90
LAL 8	Mean	0.41	0.01	0.99	-0.86
	SD	0.62	0.00	0.10	7.87
	Max	1.78	0.02	1.23	9.90
	Min	-0.87	0.01	0.79	-9.90

Table 7.2.2: Mathematics - Summary of the Infit and Outfit Statistics by Grade

	Measure	INFIT		OUTFIT	
		Model Error	MNSQ	ZSTD	MNSQ
Math 3	Mean	0.15	0.01	1.00	-0.45
	SD	0.73	0.00	0.11	8.60
	Max	1.36	0.02	1.36	9.90
	Min	-1.73	0.00	0.11	-9.90
Math 4	Mean	0.01	0.01	1.00	-0.31
	SD	0.76	0.00	0.09	7.89
	Max	1.47	0.02	1.27	9.90
	Min	-1.67	0.00	0.09	-9.90
Math 5	Mean	0.24	0.01	0.99	-2.23
	SD	0.78	0.00	0.13	8.29
	Max	1.77	0.02	1.43	9.90
	Min	-1.20	0.00	0.13	-9.90
Math 6	Mean	0.14	0.01	1.04	-0.03
	SD	0.70	0.00	0.23	8.35
	Max	1.53	0.02	2.14	9.90
	Min	-1.14	0.00	0.23	-9.90
Math 7	Mean	0.19	0.01	0.99	-0.51
	SD	0.73	0.00	0.11	8.60
	Max	1.60	0.02	1.19	9.90
	Min	-1.76	0.00	0.11	-9.90
Math 8	Mean	0.48	0.01	1.00	-0.26
	SD	0.82	0.00	0.10	8.48
	Max	1.96	0.02	1.18	9.90
	Min	-1.26	0.00	0.10	-9.90
Science 4	Mean	0.18	0.01	1.00	-1.09
	SD	0.38	0.00	0.08	7.61
	Max	1.06	0.01	1.17	9.90
	Min	-0.45	0.00	0.79	-9.90
Science 8	Mean	-0.05	0.01	1.00	-0.90
	SD	0.54	0.00	0.08	7.70
	Max	0.97	0.02	1.23	9.90
	Min	-1.55	0.01	0.82	-9.90

The Item Parameter tables located in Appendix G contain the displacement statistics for the common items generated from the anchor calibrations. The displacement statistic is a measure of the size of the change in the parameter estimate that would be observed in the next iteration if the targeted parameter were unconstrained and all other parameter estimates were held constant at current values. A large displacement value indicates lack of convergence, or the presence of

anchored or targeted values. It is recommended that “random displacements of less than 0.50 logits are unlikely to have much impact in a test instrument” (Linacre, 2006, p. 280)⁴⁰. The tables in Appendix G show that all displacement statistics of the common items are smaller than 0.50, indicating the anchored calibrations converged well with the exception of the grade 6 Mathematics assessment. Three anchor items exhibited displacement values greater than 1.00, suggesting the possibility of poor/lack of convergence. The Winsteps Convergence Table, however, indicates convergence after the 33rd iteration.

7.3 Summary of Cut Scores

Total scores for NJ ASK 2011 were reported in scale scores with a range of 100–300. Note that scores of 100 and 300 were a theoretical floor and ceiling and may not actually have been observed for some grades and/or content areas. However, for each test, for a perfect raw score, the scale score was set to 300. A scale score of 200 represents the cut point between Partially Proficient (PP) and Proficient (P) while a scale score of 250 represents the cut point between Proficient and Advanced Proficient (AP). The scale score ranges are as following:

Partially Proficient	100 to 199
Proficient	200 to 249
Advanced Proficient	250 to 300

To produce the scale score ranges above, linear transformations were applied to theta estimates and scale scores. The following formula was used to obtain the slopes and intercepts for the transformation functions:

$$sc(y) = \left[\frac{sc(y_2) - sc(y_1)}{\theta_2 - \theta_1} \right] y + \left\{ (sc(y_1)) - \left[\frac{sc(y_2) - sc(y_1)}{\theta_2 - \theta_1} \right] \theta_1 \right\}$$

where θ_1 and θ_2 are person parameter estimates that correspond to the cut score points, and $sc(y_1)$ and $sc(y_2)$ are scale score points. The above formula was adopted from Kolen and Brennan (2004, p. 337)⁴¹. New standards have been set for various grades and content areas of the NJ ASK assessment at different times. Regardless of when new standards have been set, $sc(y_1)$ has always been 200 and $sc(y_2)$ has always been 250. Slopes and intercepts of the transformation functions are summarized in Table 7.3.1. The following sections specify how these slopes and intercepts were used to generate the scale scores in each content area and grade level. The complete raw to scale score conversion tables can be found in Appendix H.

⁴⁰ Linacre, J. M. (2006). *A user’s guide to Winsteps Ministep Rasch-model computer program*. Chicago: MESA Press.

⁴¹ Kolen, M. J., & Brennan, R. L. (2004). *Test equating: Methods and practice*. NY: Springer.

Table 7.3.1: Slope and Intercept of Theta to Scale Score Transformation

Test	Grade	Proficient			Advanced Proficient			Slope	Intercept
		RS	Theta	SS	RS	Theta	SS		
LAL	3	25	0.1013	200	36	2.3374	250	21.66	196.39
	4	32	0.1822	200	44	2.1845	250	26.40	193.00
	5	33	0.2194	200	48	2.0707	250	28.41	191.97
	6	39	0.4672	200	55	2.3113	250	25.91	188.59
	7	39	0.0398	200	53	1.4910	250	33.07	198.38
	8	35	0.3077	200	55	2.5286	250	22.35	192.36
Math	3	24	0.184	200	38	1.4206	250	38.76	192.26
	4	24	0.0468	200	39	1.4554	250	36.98	196.89
	5	23	0.1482	200	38	1.637	250	32.12	195.32
	6	22	0.0529	200	39	1.6422	250	31.54	196.96
	7	24	0.249	200	39	1.7084	250	33.84	190.37
	8	21	0.2995	200	35	1.6733	250	36.45	187.18
Science	4	16	0.0180	200	27	0.6917	250	73.99	198.51
	8	25	-0.165	200	42	1.311	250	33.51	205.16

After calibrating the 2011 LAL and Mathematics assessments in grades 3-8 and the Science assessments in grades 4 and 8 to the base scales, the raw score to theta conversion table produced by Winsteps was used to develop the raw score to scale score tables. Using the slopes and intercepts shown in Table 7.3.1, linear transformations of the Winsteps theta estimates were conducted to produce the final content area scaled scores for grades 3-8.

In addition to the above scaling transformation, NJ DOE policy requires that scaled scores below 100 are rounded up to 100 and scaled scores above 300 are rounded down to 300. NJDOE also requires that the following rules apply:

1. If a raw score maps to an unrounded scale score that is greater than 199.499 and less than 201.000, it will serve as the proficient cut score. Otherwise, the highest raw score that maps to a scale score less than or equal to 199.499 will serve as the cut score. The selected cut score will be assigned a value of exactly 200.
2. If a raw score maps to an unrounded scale score that is greater than 249.499 and less than 251.000, it will serve as the advanced cut score. Otherwise, the highest raw score that maps to a scale score less than or equal to 249.499 will serve as the cut score. The selected cut score will be assigned a value of exactly 250.
3. In the unlikely event that two scores fall >199.499 and <201.000 or >249.999 and <251.000, the lower of these two scores would become the cut score.

7.4 Equating and Scaling for Braille, Large Print, and Alternate Forms

This section describes the equating procedures for scores from the Large Print, Braille, and Alternate forms of the NJ ASK 2011. Items that the Commission of the Blind deemed inappropriate were not scored for student with visual impairments. Braille and Large Print test forms were constructed by removing the inappropriate items from the corresponding regular test forms. No items were removed from the 2011 NJ ASK Large Print forms for any grade/content areas. Additionally, no items were removed from the Braille forms of the LAL tests, however the writing tasks were replaced. All required modifications are summarized in Table 7.4.1. Results from these “special equatings” appear in Appendix H.

Table 7.4.1: Special Equatings

	Total Items	Items Removed or Modified	Raw Score Range
LAL Grade 3			
Alternate	23	None	0-50
Braille	23	None	0-50
LAL Grade 4			
Alternate	29	None	0-56
Braille	29	None	0-56
LAL Grade 5			
Alternate	35	None	0-62
Braille	35	None	0-62
LAL Grade 6			
Alternate	42	None	0-70
Braille	42	None	0-70
Spanish (Special Equ)	41	33 (MC) Translation issue	0-69
Special Equating 1	40	7 and 9 Unscorable, torn	0-68
Special Equating 2	33	1 - 9 Unscorable, torn t	0-61
LAL Grade 7			
Alternate	42	None	0-70
Braille	42	None	0-70
LAL Grade 8			
Alternate	42	None	0-70
Braille	42	None	0-70
Special Equating 2	33	1 - 9 Unscorable, torn	0-61

	Total Items	Items Removed or Modified	Raw Score Range
Mathematics Grade 3			
Alternate	44	None	0-50
Braille	42	19 (MC), 28 (ECR)	0-46
Mathematics Grade 4			
Alternate	44	None	0-50
Braille	42	27 (MC), 46 (ECR)	0-46
Mathematics Grade 5			
Alternate/Braille	43	24	0-47
Mathematics Grade 6			
Alternate	43	None	0-49
Braille	38	14 (MC), 17 (MC), 19 (ECR), 29 (MC), 40 (MC)	0-42
Special Equating	42	50(ECR) Unscorable, torn	0-46
Mathematics Grade 7			
Alternate	43	None	0-49
Braille	42	19 (ECR)	0-46
Mathematics Grade 8			
Alternate	43	None	0-49
Braille	41	18 (MC), 39 (ECR)	0-45
Spanish	42	39 (ECR) Translation issue	0-46
Science Grade 4			
Alternate	35	None	0-39
Braille	32	12 (MC), 21 (MC), 30 (MC)	0-36
Science Grade 8			
Alternate	50	None	0-54
Braille	49	2 (MC)	0-53

Braille and Large Print Tests. Several assumptions had to be made in order to equate the scores of the Braille and Large Print tests to the scores of the regular test. First, it was assumed that the latent trait measured by the Braille tests and the regular test was the same. Given the fact that the same items were used across the tests within each content area, with the exception of the removed items, it seemed reasonable to assume that changes to item format or item presentation would not greatly change the overall latent trait or construct measured by each assessment.

A second, stronger assumption, however, was that item parameters across the tests within each content area were identical. This of course is a very strong assumption considering the different item formats across the tests. However, this assumption was necessary because sample sizes for the Braille tests were too small to get reliable parameter estimates. Moreover, making these assumptions is considered common and current best practice for these populations. Because the first assumption noted above is reasonable, i.e., for each test the mathematics assessment measures mathematics, the following steps for equating the Braille tests to the regular tests were used:

- Conduct an anchored item calibration. The items in Table 7.4.1 were removed and the parameters and steps of the Braille test items were fixed with the estimates resulting from the corresponding regular test items.
- Transform the theta metric to the scale score metric. Because the theta values obtained from the anchored calibration and those obtained from the regular test score calibration are on the same metric, the transformation functions applied to the regular test scores can be applied to the Braille test scores.
- Create raw score to scale score look-up tables for each Braille test. In cases where no raw score corresponds to the cut scale scores (200 for Proficient and 250 for Advanced Proficient), the raw score point immediately below the cut score was assigned as the cut point scale score.

Alternate Forms. A security violation or a deviation from the standardized administration procedures of the NJ ASK is defined as a testing breach. An alternate form of the test was constructed for each grade and content area of the 2011 NJ ASK tests with items from previous administrations. The alternate form was administered to all students of a given grade/content area affected when a breach occurred. Equating of the alternate forms was conducted in a manner similar to that used with the Braille.

PART 8: RELIABILITY

The New Jersey Department of Education is required by federal law to ensure that the instruments it uses to measure student achievement for school accountability provide reliable results. This section shows that results of the NJ ASK 2011 3–8 measure student achievement in a reliable manner. The size of the measurement error associated with test scores is reasonable and can be taken into account when interpreting the scores for individual students.

8.1 Classical Reliability Estimates of Test Scores

Reliability and Measurement Error

A detailed review of the relationship between reliability and measurement can be found in the 2009 NJ ASK Technical Report (PTM 1507-34), Part 8 , section 8.1.

Raw Score Internal Consistency

Consistency of individual student performance was estimated using Cronbach's coefficient alpha. Coefficient alpha is conceptualized as the proportion of total raw score variance that may be attributed to a student's true score variance. Ideally, more score variance should be attributable to true test scores than to measurement error. Alpha is an appropriate index of internal consistency for use on untimed tests such as NJ ASK.

Separate analyses were performed for each grade level and content area. Both MC and CR items scores were used in the computations. Coefficient alpha can be interpreted as a lower bound to reliability and was estimated using the following formula:

$$\alpha_{\text{Cronbach}} = \frac{n}{n-1} \left[1 - \frac{\sum_{i=1}^n \sigma_{Y_i}^2}{\sigma_X^2} \right],$$

where n is the number of items, $\sigma_{Y_i}^2$ is the variance of item i , and σ_X^2 is the variance of total score.

SEMs were calculated using the following formula: $SEM = S_X \sqrt{1 - \alpha_{\text{Cronbach}}}$,

where S_X is the standard deviation of observed total scores. Table 8.1.1 summarizes coefficient alpha and SEMs by content and form. Tables 8.1.2 through 8.1.7 summarize coefficient alpha and SEMs of content clusters by test. Tables 8.1.2a – 8.1.7a summarize coefficient alpha and SEMs by item type at the test and cluster level for MC items and at the test level for SCR items. Reliability coefficients are commonly low when based upon small numbers of items⁴².

(See the following for a further discussion of the relationship between measures of reliability and numbers of items:
Traub, R. E. and Rowley, G. L. (2008). Understanding reliability. *Instructional topics in educational measurement*. Madison, WI: National Council on Measurement and Education 176-177. Also available at: www.ncme.org/pubs/items/15.pdf).⁴²

Table 8.1.1: Summary of Coefficient Alpha and SEM by Grade and Content Area

Test	Form*	Grade	N-count	Cronbach Alpha	SEM
LAL	OP	3	99695	0.81	2.88
	OP	4	101188	0.84	3.24
	OP	5	101611	0.87	3.30
	OP	6	102452	0.89	3.40
	OP	7	102461	0.88	3.52
	OP	8	102245	0.91	3.25
Spanish LAL	SP	3	694	0.77	3.46
	SP	4	656	0.75	3.82
	SP	5	709	0.73	3.66
	SP	6	790	0.85	3.84
	SP	7	906	0.75	4.21
	SP	8	906	0.83	4.04
LAL Special Education	OP	3	15900	0.82	3.01
	OP	4	16974	0.85	3.51
	OP	5	16651	0.86	3.50
	OP	6	16291	0.89	3.63
	OP	7	16048	0.86	3.81
	OP	8	16172	0.89	3.67
LAL Current Limited English Proficient	OP	3	4877	0.78	3.03
	OP	4	3234	0.81	3.55
	OP	5	2633	0.80	3.63
	OP	6	2364	0.86	3.70
	OP	7	2411	0.80	3.99
	OP	8	2451	0.86	3.92
Mathematics	OP	3	100026	0.90	3.23
	OP	4	101532	0.90	3.19
	OP	5	101919	0.92	3.02
	OP	6	102755	0.91	3.23
	OP	7	102669	0.92	3.20
	OP	8	102301	0.92	3.13
Spanish Mathematics	SP	3	696	0.89	3.20
	SP	4	654	0.88	3.16
	SP	5	707	0.87	3.14
	SP	6	790	0.87	3.08
	SP	7	906	0.84	2.98
	SP	8	907	0.81	2.78
Mathematics Special Education	OP+	3	15940	0.91	3.35
	OP	4	17012	0.91	3.30
	OP	5	16679	0.92	3.17
	OP	6	16315	0.90	3.30
	OP	7	16046	0.90	3.17
	OP	8	16116	0.89	3.01

Table 8.1.1: Summary of Coefficient Alpha and SEM by Grade and Content Area (continued)

Test	Form*	Grade	N-count	Cronbach Alpha	SEM
Mathematics Current Limited English Proficient	OP	3	5160	0.90	3.35
	OP	4	3527	0.90	3.28
	OP	5	2891	0.92	3.18
	OP	6	2635	0.91	3.24
	OP	7	2636	0.90	3.11
	OP	8	2645	0.90	2.96
Science	OP	4	101467	0.84	2.71
	OP	8	102227	0.90	3.26
Spanish Science	SP	4	654	0.78	2.88
	SP	8	903	0.71	3.44
Science Special Education	OP+	4	17020	0.86	2.82
	OP	8	16138	0.88	3.43
Science Current Limited English Proficient	OP	4	3524	0.83	2.88
	OP	8	2638	0.81	3.46

- OP: Operational Test; SP: Spanish Version; SE: Special Education, LEP: Current Limited English Proficient
N-counts were insufficient to produce values for Braille and Large Print.

Table 8.1.2: Grade 3 Coefficient Alpha and SEM for Clusters

	Number of Items			Max Points	Alpha	SEM
	MC	CR	SCR			
LAL	18	5		50	0.82	3.16
Writing		2		20	0.70	1.60
Reading	18	3		30	0.82	2.22
Working with Text	12	0		12	0.69	1.56
Analyzing Text	6	3		18	0.69	1.53
Math	35	3	6	50	0.90	3.38
Number & Numerical Operations	11	1	6	20	0.82	2.03
Geometry & Measurement	8	1	0	11	0.60	1.62
Patterns & Algebra	11	0	0	11	0.68	1.44
Data Analysis, Probability, & Discrete Mathematics	5	1	0	8	0.56	1.53
<i>Problem Solving</i>	5	3	0	14	0.68	2.05
<i>Calculator</i>	8	1	0	11	0.67	1.63

Table 8.1.2.a: Grade 3 Coefficient Alpha and SEM for MC Clusters and SCRs*

Subject/Cluster	Number of Items	Alpha	SEM
LAL MC	18	0.77	1.92
Working with Text	12	0.69	1.56
Analyzing Text	6	0.53	1.09
Math MC	35	0.87	2.59
Number & Numerical Operations	11	0.72	1.40
Geometry & Measurement	8	0.57	1.23
Patterns & Algebra	11	0.68	1.44
Data Analysis, Probability, & Discrete Mathematics	5	0.52	0.98
<i>Problem Solving</i>	5	0.48	0.92
<i>Calculator</i>	8	0.65	1.14
Math SCR	6	0.66	1.01

*Except where a cluster contains no constructed responses (extended or short), the statistics apply to item types that comprise parts of tests or parts of clusters.

Table 8.1.3: Grade 4 Coefficient Alpha and SEM for Clusters

	Number of Items			Max Points	Alpha	SEM
	MC	CR	SCR			
LAL	24	5		56	0.84	3.57
Writing		2		20	0.72	1.76
Reading	24	3		36	0.85	2.50
Working with Text	14	0		14	0.72	1.61
Analyzing Text	10	3		22	0.77	1.87
Math	35	3	6	50	0.90	3.34
Number & Numerical Operations	11	1	6	20	0.82	1.97
Geometry & Measurement	8	1	0	11	0.61	1.67
Patterns & Algebra	8	1	0	11	0.64	1.59
Data Analysis, Probability, & Discrete Mathematics	8	0	0	8	0.58	1.29
<i>Problem Solving</i>	11	3	0	20	0.78	2.27
<i>Calculator</i>	8	1	0	11	0.66	1.57
Science	33	2		39	0.84	2.90
Life Science	13	1		16	0.69	1.82
Physical Science	9	1		12	0.63	1.59
Earth Science	11	0		11	0.57	1.52
<i>Comprehension/Recall</i>	7	0		7	0.59	1.05
<i>Application</i>	22	2		28	0.77	2.36
<i>Data Analysis</i>	4	0		4	0.40	0.82

Table 8.1.3.a: Grade 4 Coefficient Alpha and SEM for MC Clusters and SCRs*

Subject/Cluster	Number of Items	Alpha	SEM
LAL MC	24	0.83	2.13
Working with Text	14	0.72	1.61
Analyzing Text	10	0.69	1.37
Math MC	35	0.87	2.62
Number & Numerical Operations	11	0.74	1.32
Geometry & Measurement	8	0.56	1.29
Patterns & Algebra	8	0.59	1.22
Data Analysis, Probability, & Discrete Mathematics	8	0.58	1.29
<i>Problem Solving</i>	11	0.72	1.42
<i>Calculator</i>	8	0.62	1.19
Math SCR	6	0.63	0.98

Table 8.1.3.a: Grade 4 Coefficient Alpha and SEM for MC Clusters and SCRs (continued)*

Subject/Cluster	Number of Items	Alpha	SEM
Science MC	33	0.83	2.61
Life Science	13	0.66	1.61
Physical Science	9	0.61	1.28
Earth Science	11	0.57	1.52
<i>Comprehension/Recall</i>	7	0.59	1.05
<i>Application</i>	22	0.73	2.02
<i>Data Analysis</i>	4	0.40	0.82

*Except where a cluster contains no constructed responses (extended or short), the statistics apply to item types that comprise parts of tests or parts of clusters.

Table 8.1.4: Grade 5 Coefficient Alpha and SEM for Clusters

	Number of Items			Max Points	Alpha	SEM
	MC	CR	SCR			
LAL	30	5		62	0.87	3.58
Writing		2		20	0.70	1.69
Reading	30	3		42	0.88	2.70
Working with Text	17	0		17	0.78	1.81
Analyzing Text	13	3		25	0.77	1.98
Math	33	3	8	50	0.92	3.15
Number & Numerical Operations	12	1	3	18	0.82	1.86
Geometry & Measurement	11	1	2	16	0.79	1.75
Patterns & Algebra	4	1	1	8	0.56	1.34
Data Analysis, Probability, & Discrete Mathematics	6	0	2	8	0.72	1.16
<i>Problem Solving</i>	12	3	1	22	0.81	2.22
<i>Calculator</i>	20	2	0	26	0.86	2.14

Table 8.1.4.a: Grade 5 Coefficient Alpha and SEM for MC Clusters and SCRs*

Subject/Cluster	Number of Items	Alpha	SEM
LAL MC	30	0.86	2.46
Working with Text	17	0.78	1.81
Analyzing Text	13	0.73	1.64
Math MC	33	0.89	2.42
Number & Numerical Operations	12	0.78	1.38
Geometry & Measurement	11	0.71	1.42
Patterns & Algebra	4	0.47	0.84
Data Analysis, Probability, & Discrete Mathematics	6	0.62	1.03
<i>Problem Solving</i>	12	0.75	1.47
<i>Calculator</i>	20	0.85	1.76
Math SCR	8	0.76	1.13

*Except where a cluster contains no constructed responses (extended or short), the statistics apply to item types that comprise parts of tests or parts of clusters.

Table 8.1.5: Grade 6 Coefficient Alpha and SEM for Clusters

	Number of Items			Max Points	Alpha	SEM
	MC	CR	SCR			
LAL	36	6		70	0.89	3.75
Writing		2		18	0.67	1.60
Reading	36	4		52	0.89	3.06
Working with Text	21	0		21	0.78	2.05
Analyzing Text	15	4		31	0.81	2.23
Math	32	3	8	49	0.91	3.35
Number & Numerical Operations	10	0	3	13	0.76	1.55
Geometry & Measurement	9	1	2	14	0.72	1.91
Patterns & Algebra	9	1	2	14	0.74	1.76
Data Analysis, Probability, & Discrete Mathematics	4	1	1	8	0.59	1.43
<i>Problem Solving</i>	17	3	3	29	0.85	2.73
<i>Calculator</i>	20	2	0	26	0.84	2.39

Table 8.1.5.a: Grade 6 Coefficient Alpha and SEM for MC Clusters and SCRs*

Subject/Cluster	Number of Items	Alpha	SEM
LAL MC	36	0.86	2.73
Working with Text	21	0.78	2.05
Analyzing Text	15	0.73	1.78
Math MC	32	0.87	2.49
Number & Numerical Operations	10	0.70	1.35
Geometry & Measurement	9	0.59	1.42
Patterns & Algebra	9	0.67	1.24
Data Analysis, Probability, & Discrete Mathematics	4	0.46	0.90
<i>Problem Solving</i>	17	0.77	1.87
<i>Calculator</i>	20	0.82	1.88
Math SCR	8	0.74	1.15

*Except where a cluster contains no constructed responses (extended or short), the statistics apply to item types that comprise parts of tests or parts of clusters.

Table 8.1.6: Grade 7 Coefficient Alpha and SEM for Clusters

	Number of Items			Max Points	Alpha	SEM
	MC	CR/ECR	SCR			
LAL	36	6		70	0.88	3.85
Writing		2		18	0.62	1.79
Reading	36	4		52	0.88	3.08
Working with Text	20	0		20	0.78	2.07
Analyzing Text	16	4		32	0.81	2.24
Math	32	3	8	49	0.92	3.30
Number & Numerical Operations						
Geometry & Measurement	8	1	2	13	0.79	1.70
Patterns & Algebra	9	1	2	14	0.75	1.77
Data Analysis, Probability, & Discrete Mathematics	9	1	2	14	0.74	1.79
Problem Solving	6	0	2	8	0.61	1.24
Calculator	16	2	2	24	0.84	2.71
	20	2	0	26	0.84	2.41

Table 8.1.6.a: Grade 7 Coefficient Alpha and SEM for MC Clusters and SCRs*

Subject/Cluster	Number of Items	Alpha	SEM
LAL MC	36	0.86	2.75
Working with Text	20	0.78	2.07
Analyzing Text	16	0.72	1.78
Math MC	32	0.88	2.51
Number & Numerical Operations	8	0.70	1.23
Geometry & Measurement	9	0.65	1.33
Patterns & Algebra	9	0.66	1.29
Data Analysis, Probability, & Discrete Mathematics	6	0.50	1.10
Problem Solving	16	0.79	1.75
Calculator	20	0.81	1.91
Math SCR	8	0.76	1.13

*Except where a cluster contains no constructed responses (extended or short), the statistics apply to item types that comprise parts of tests or parts of clusters.

Table 8.1.7: Grade 8 Coefficient Alpha and SEM for Clusters

	Number of Items				Alpha	SEM
	MC	CR	SCR	Max Points		
LAL	36	6		70	0.91	3.57
Writing		2		18	0.65	1.61
Reading	36	4		52	0.91	2.91
Working with Text	23	0		23	0.86	2.01
Analyzing Text	13	4		29	0.82	2.06
Math	32	3	8	49	0.92	3.23
Number & Numerical Operations	8	1	2	13	0.77	1.75
Geometry & Measurement	9	1	2	14	0.73	1.75
Patterns & Algebra	9	1	2	14	0.75	1.65
Data Analysis, Probability, & Discrete Mathematics	6	0	2	8	0.68	1.21
<i>Problem Solving</i>	21	3	4	34	0.88	2.76
<i>Calculator</i>	20	2	0	26	0.85	2.36
Science	48	2		54	0.90	3.47
Life Science	19	2		25	0.77	2.61
Physical Science	17	0		17	0.73	1.89
Earth Science	12	0		12	0.76	1.37
<i>Comprehension/Recall</i>	9	0		9	0.61	1.30
<i>Application</i>	33	2		39	0.86	2.80
<i>Data Analysis</i>	6	0		6	0.55	1.05

Table 8.1.7.a: Grade 8 Coefficient Alpha and SEM for MC Clusters and SCRs*

Subject/Cluster	Number of Items	Alpha	SEM
LAL MC	36	0.89	2.58
Working with Text	23	0.86	2.01
Analyzing Text	13	0.72	1.58
Math MC	32	0.87	2.50
Number & Numerical Operations	8	0.70	1.25
Geometry & Measurement	9	0.63	1.29
Patterns & Algebra	9	0.67	1.30
Data Analysis, Probability, & Discrete	6	0.57	1.06
Mathematics			
<i>Problem Solving</i>	21	0.82	2.03
<i>Calculator</i>	20	0.83	1.86
Math SCR	8	0.78	1.16
Science MC	48	0.89	3.18
Life Science	19	0.76	2.05
Physical Science	17	0.73	1.89
Earth Science	12	0.73	1.45
<i>Comprehension/Recall</i>	9	0.61	1.30
<i>Application</i>	33	0.84	2.48
<i>Data Analysis</i>	6	0.55	1.05

*Except where a cluster contains no constructed responses (extended or short), the statistics apply to item types that comprise parts of tests or parts of clusters.

8.2 Reliability of Performance Classifications

Two measures of reliability are presented below in Table 8.2.1. Stratified Alpha is used to assess the reliability of the different item types, e.g., multiple choice and constructed response. Stratified Cronbach Alpha can be calculated using the following formula:

$$\text{Stratified } \alpha = 1 - \frac{\sum \sigma_i^2 (1 - \rho_{ii'})}{\sigma_t^2}^{43}$$

where

σ_i^2 = variance of score on cluster i ,

σ_t^2 = variance of total score, and

$\rho_{ii'}$ = reliability coefficient of score on cluster i .

Reliability index for proficiency classifications (kappa) is an estimate of how reliably the test classifies students into the performance categories (Partially Proficient, Proficient, and Advanced Proficient). Kappa was computed with the BB-CLASS program (Brennan, 2004)⁴⁴ that is based on the beta-binomial model. Coefficient kappa is given by:

$$\kappa = \frac{\varphi - \varphi_c}{1 - \varphi_c},$$

where φ is the probability of a consistent classification and φ_c is the probability of a consistent classification by chance. A classification consistency index can be regarded as the percentage of examinees that would be assigned to, hypothetically, the same achievement level if the same test was administered a second time or an equivalent test was administered under the same conditions.

Table 8.2.1 displays two cut scores for each grade level and content area. The lower cut score is the minimum raw score required to be classified as proficient and the higher cut score is the minimum raw score required for classification as advanced proficient.

⁴³ Maryland school assessment – Reading: Grades 3 through 8 (2004).

http://www.marylandpublicschools.org/NR/rdonlyres/26BD65BE-6F27-4F35-8699-139BC98BF99F/8812/2004_MDTech_Reading_Report_3.pdf

⁴⁴ Brennan, R. L. (2004). Manual for BB-CLASS: A computer program that uses the beta-binomial model for classification consistency and accuracy (version 1). CASMA Research Report 9. Iowa City, IA.

Table 8.2.1: Consistency Indices for Performance Levels

Test	Grade	Stratified Alpha		Cut Score	Kappa	ϕ
		Coefficient	SEM			
LAL	3	0.86	2.51	25, 36	0.53	74%
	4	0.88	2.77	32, 44	0.54	75%
	5	0.90	2.95	33, 48	0.61	79%
	6	0.91	3.13	39, 55	0.60	79%
	7	0.90	3.25	39, 53	0.58	75%
	8	0.92	3.00	35, 55	0.61	79%
Math	3	0.91	3.08	24, 38	0.65	77%
	4	0.91	3.05	24, 39	0.64	77%
	5	0.93	2.92	23, 38	0.68	80%
	6	0.92	3.04	22, 39	0.66	79%
	7	0.93	3.00	24, 39	0.69	80%
	8	0.93	2.99	21, 35	0.68	79%
Science	4	0.85	2.67	16, 27	0.57	75%
	8	0.90	3.20	25, 42	0.65	79%

Item Maps and Test Information Functions

Item maps for LAL, mathematics, and science are presented in Appendix I. These Figures indicate how well the item difficulties and person ability levels match.

The test information function is another method of assessing the reliability or the precision of a test. The reliability of a test, however, is not uniform across the entire range of test scores. The highest and lowest scores typically have more measurement error than do scores in the middle of the range because more examinees tend to score in the middle of the score range. With item response theory (IRT), the item and test information functions can assess test reliability across the range of scores. The item information function is the probability of a correct response multiplied by the probability of an incorrect response. Item information functions (I_{ij}) for every item (j) at every level of student ability (i) can be calculated for each item using the following equation:

$$I_{ij}(\theta_i, \delta_j) = P_{ij} * (1 - P_{ij})$$

The total test information function for a given ability level is simply the sum of all the item information functions for that ability level (Lord & Novick, 1968⁴⁵; Hambleton, 1989⁴⁶). Computing an item information function for each ability level and summing these functions to

⁴⁵ Lord, F. M., & Novick, M. R. (1968). *Statistical theories of mental test scores*. Reading MA: Addison-Welsley.

⁴⁶ Hambleton, R. K. (1989). Principles and selected applications of item response theory. In R. L. Linn (Ed.), *Educational measurement* (3rd ed.). New York: American Council on Education and Macmillan.

derive test information functions for each ability level, one can plot the total information function for a test, as shown in Figures 8.2.2 – 8.2.15. Each item yields the greatest amount of information at the point at which the difficulty of the item (δ_i) is equal to the ability of the student (θ_i).

These figures illustrate the level of information at theta values ranging from -4 to +4. As shown, the information or reliability of the test scores are lower at the extremes and higher in the middle. More information implies less measurement error. Ideally, the Proficient cut score would occur at the peak of the information function where the most information and the least measurement error occurs. Thus, scores in this area yield the most error free measurements. Two arrows appear in each TIF shown below. The arrow with the lower value on the x -axis (measure) represents the proficient cut and the arrow with the higher value represents the advance proficient cut. As depicted in these figures, the Proficient cut scores for LAL, mathematics, and science all occur near the peak of information.

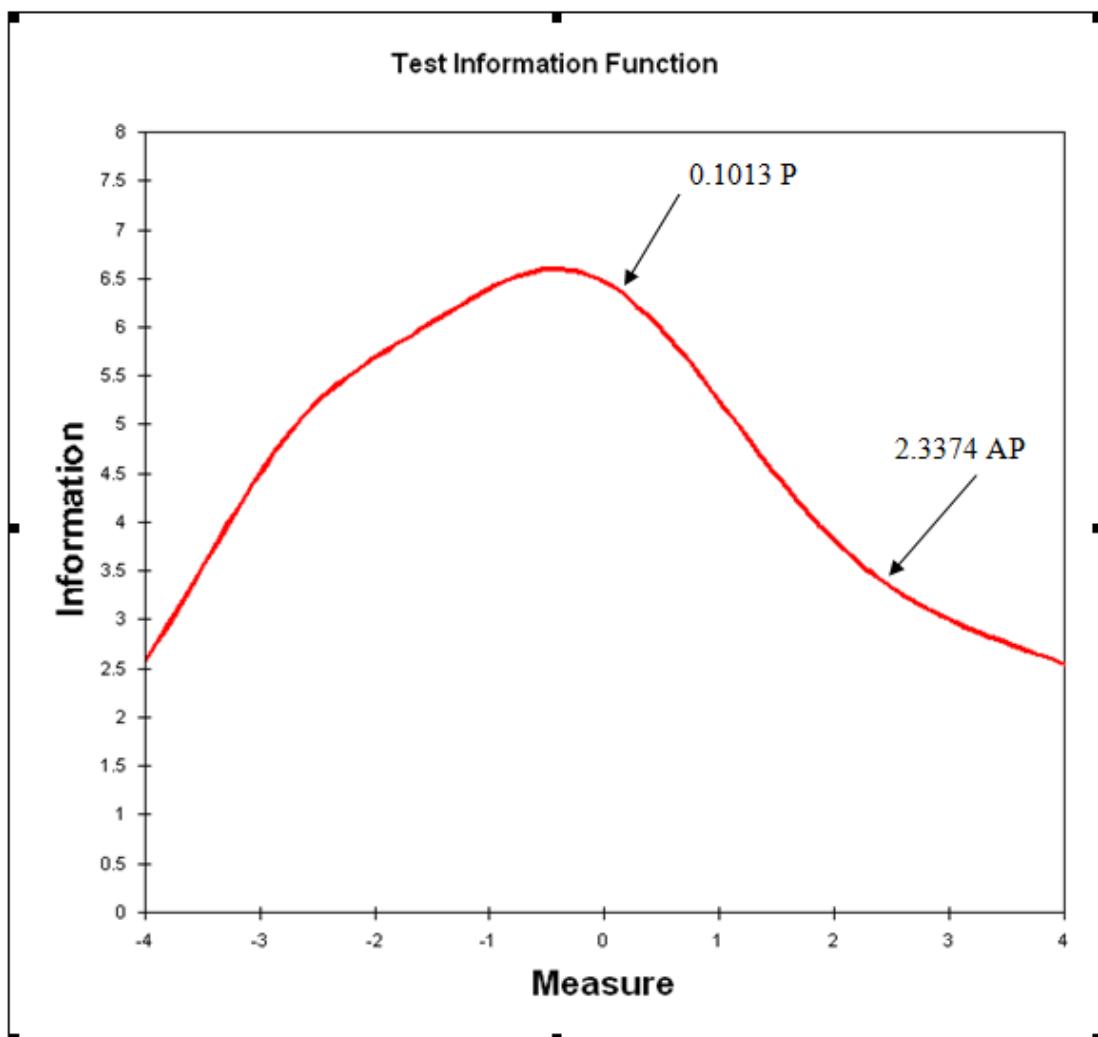


Figure 8.2.1: Grade 3 LAL Test Information Function – Total Population

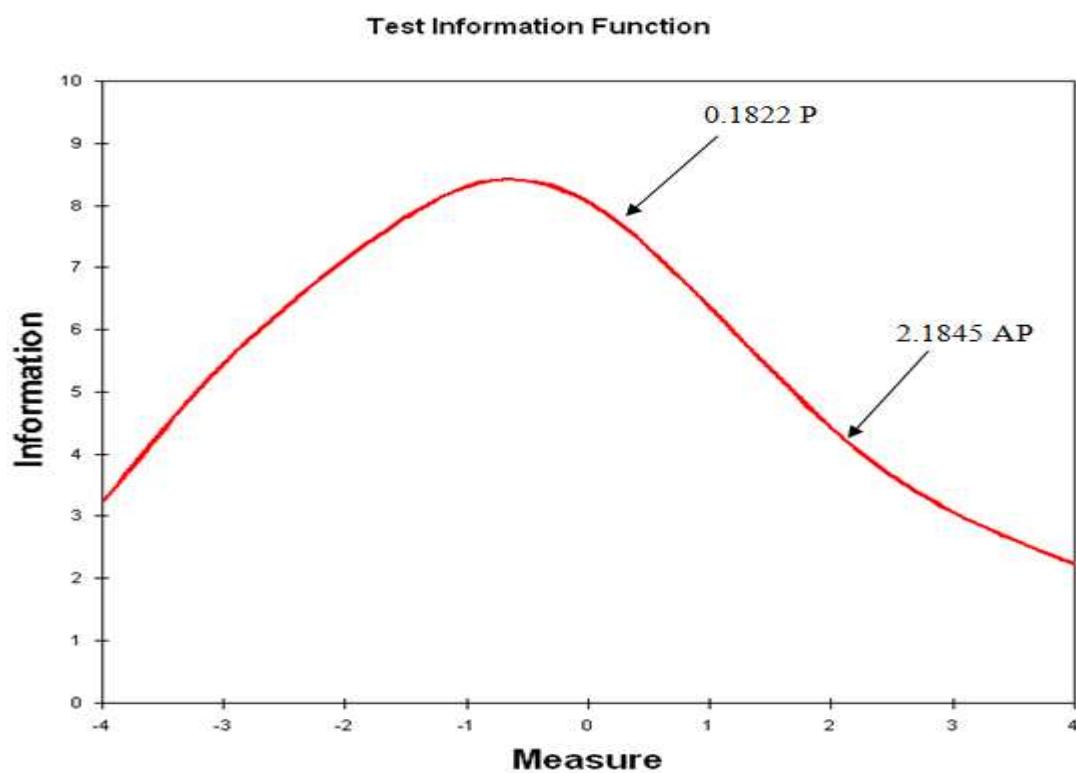


Figure 8.2.2: Grade 4 LAL Test Information Function – Total Population

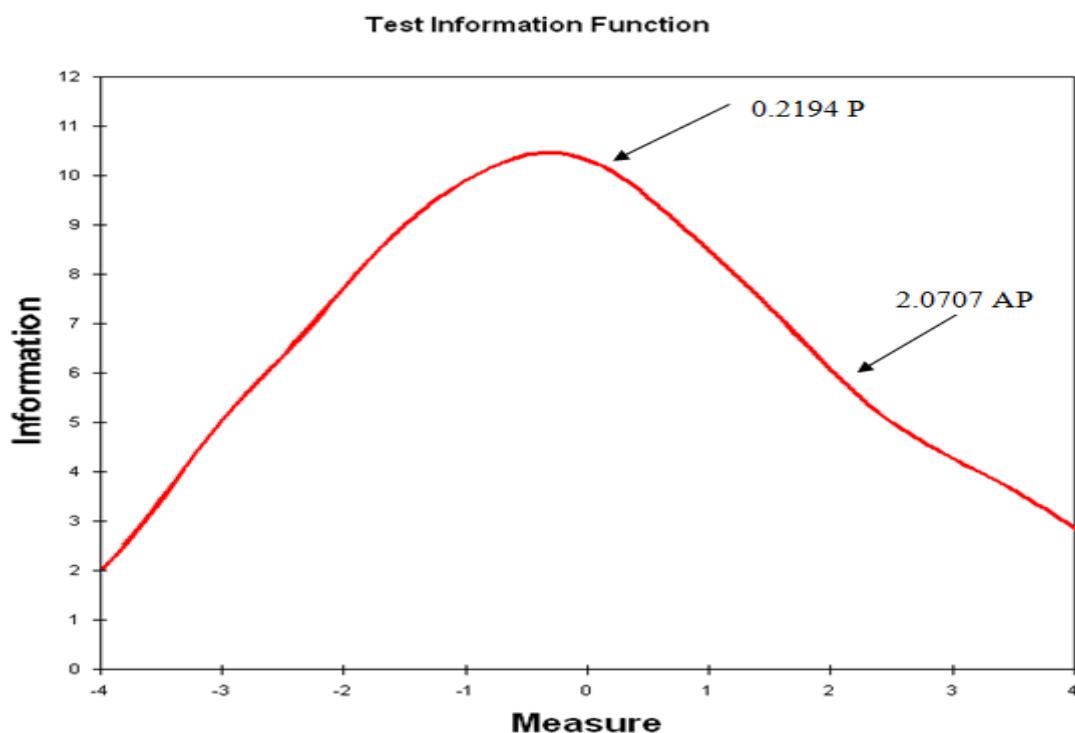


Figure 8.2.3: Grade 5 LAL Test Information Function – Total Population

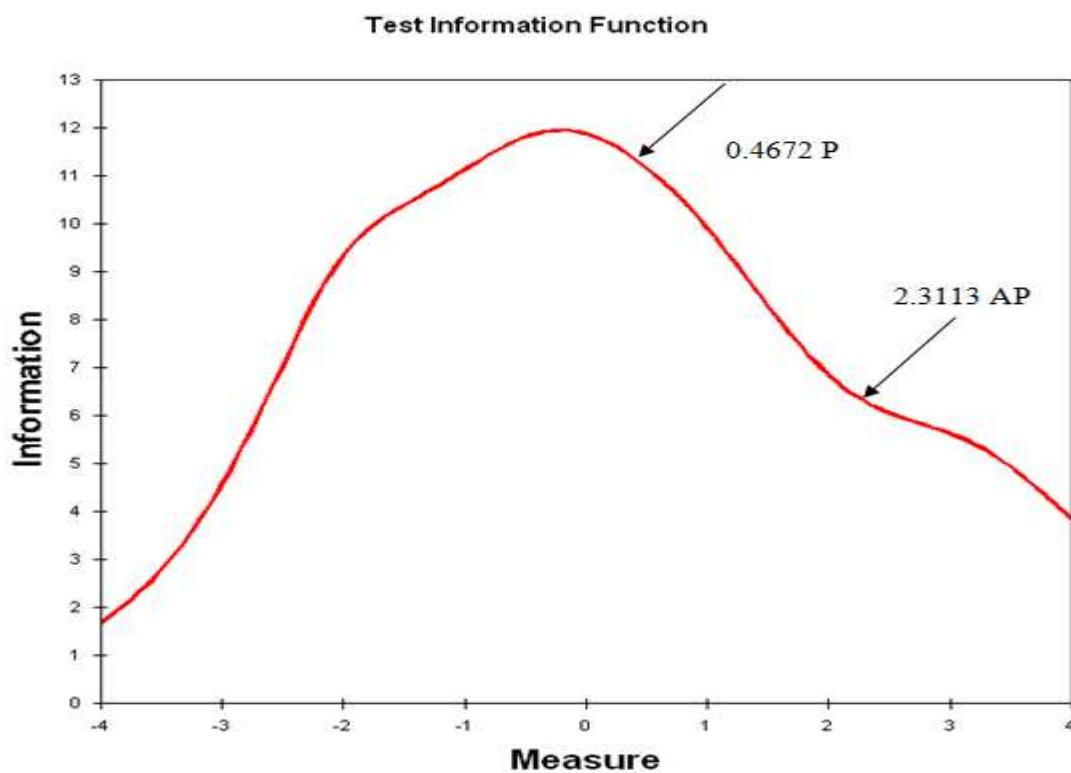


Figure 8.2.4: Grade 6 LAL Test Information Function – Total Population

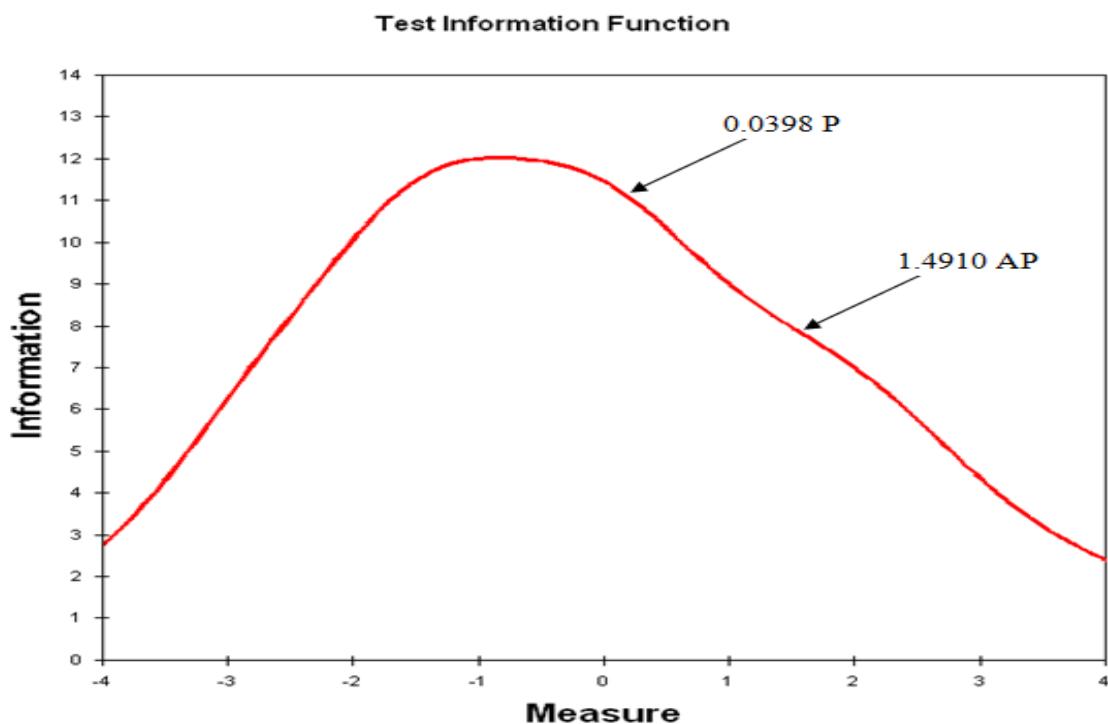


Figure 8.2.5: Grade 7 LAL Test Information Function – Total Population

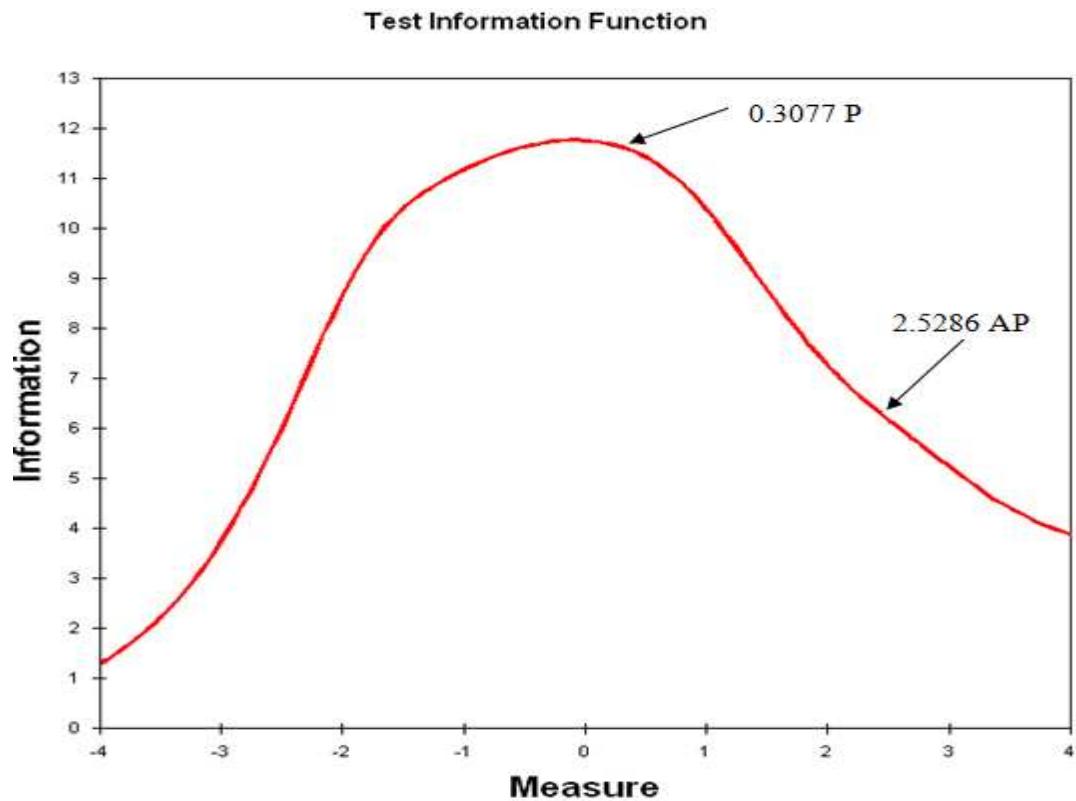


Figure 8.2.6: Grade 8 LAL Test Information Function – Total Population

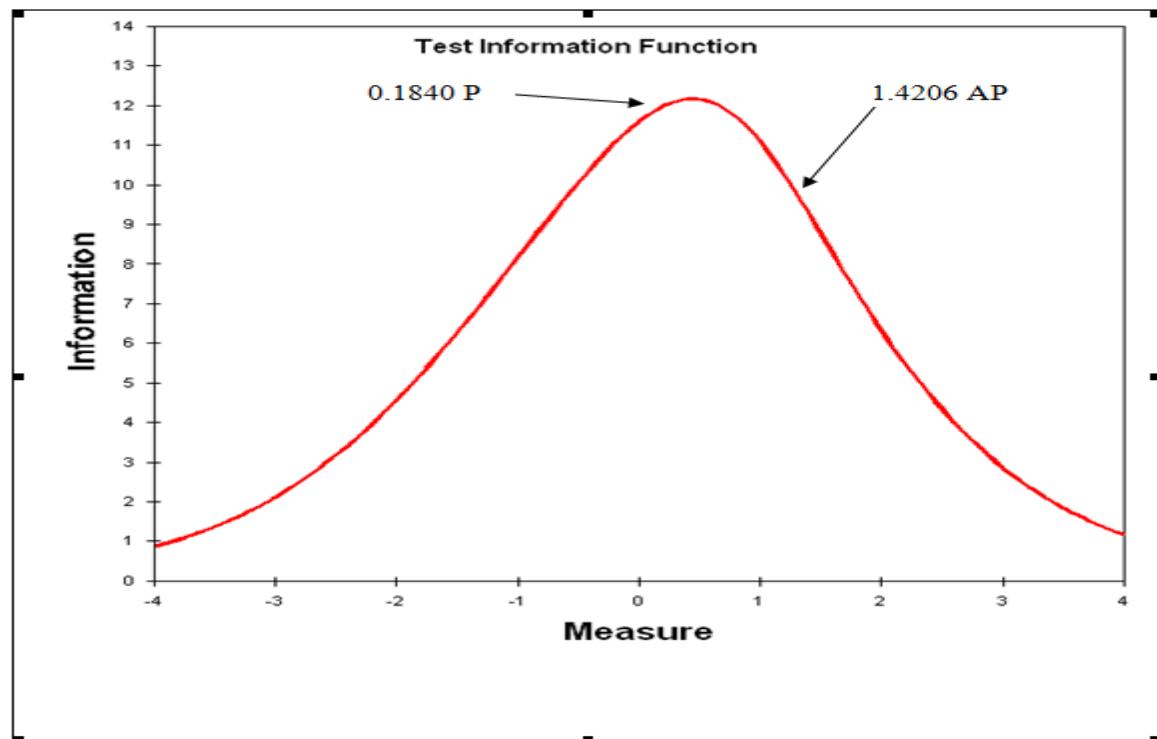


Figure 8.2.7: Grade 3 Math Test Information Function – Total Population

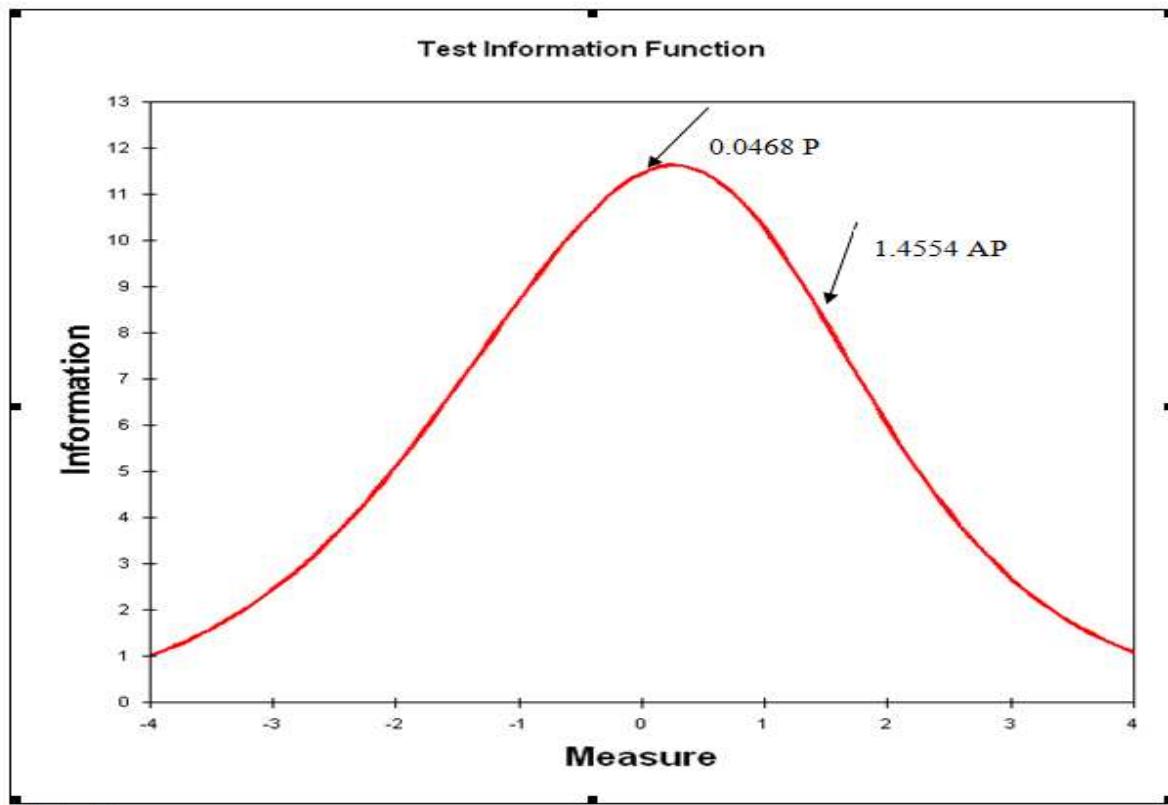


Figure 8.2.8: Grade 4 Math Test Information Function – Total Population

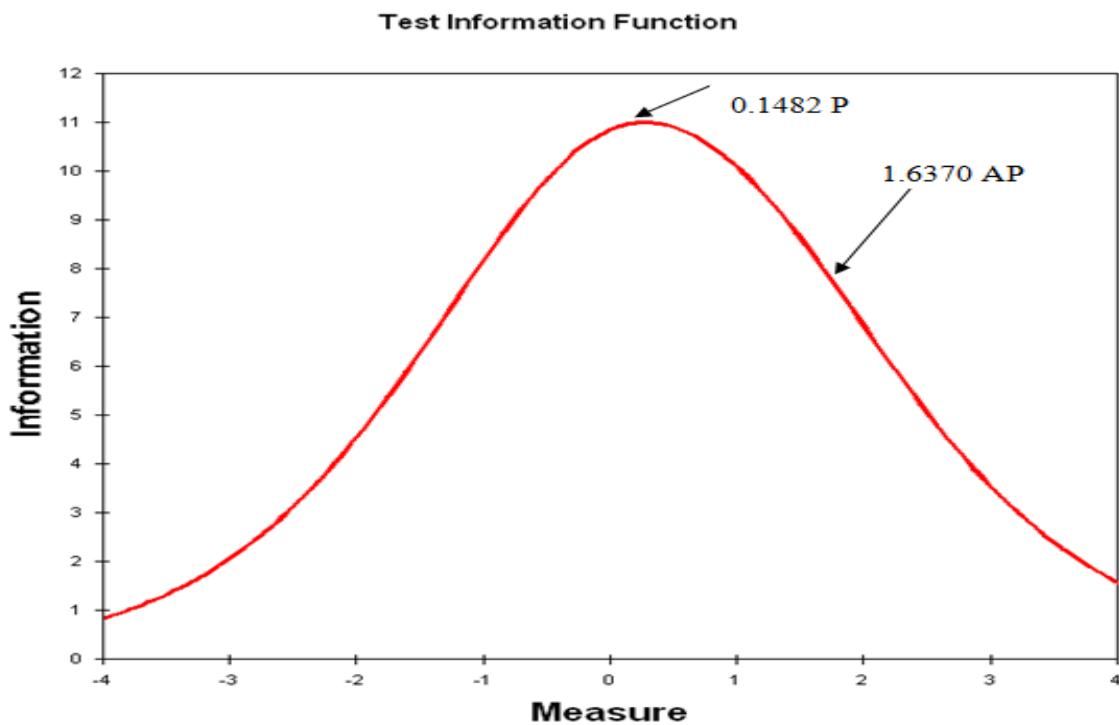


Figure 8.2.9: Grade 5 Math Test Information Function – Total Population

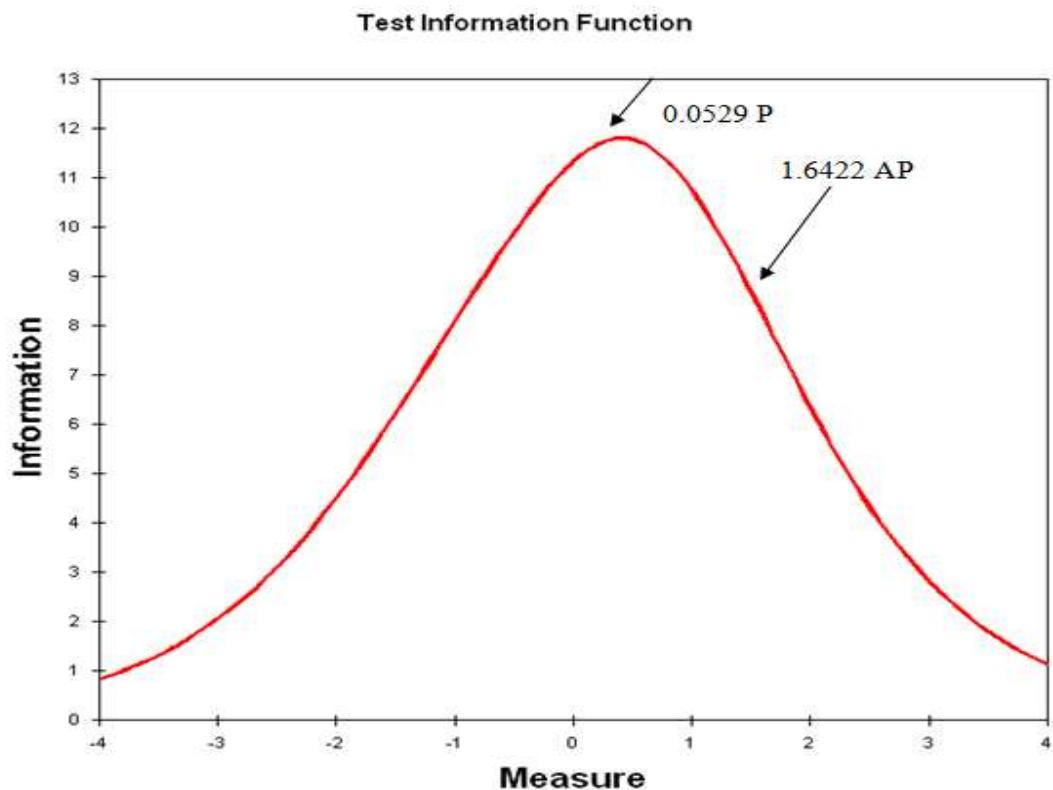


Figure 8.2.10: Grade 6 Math Test Information Function – Total Population

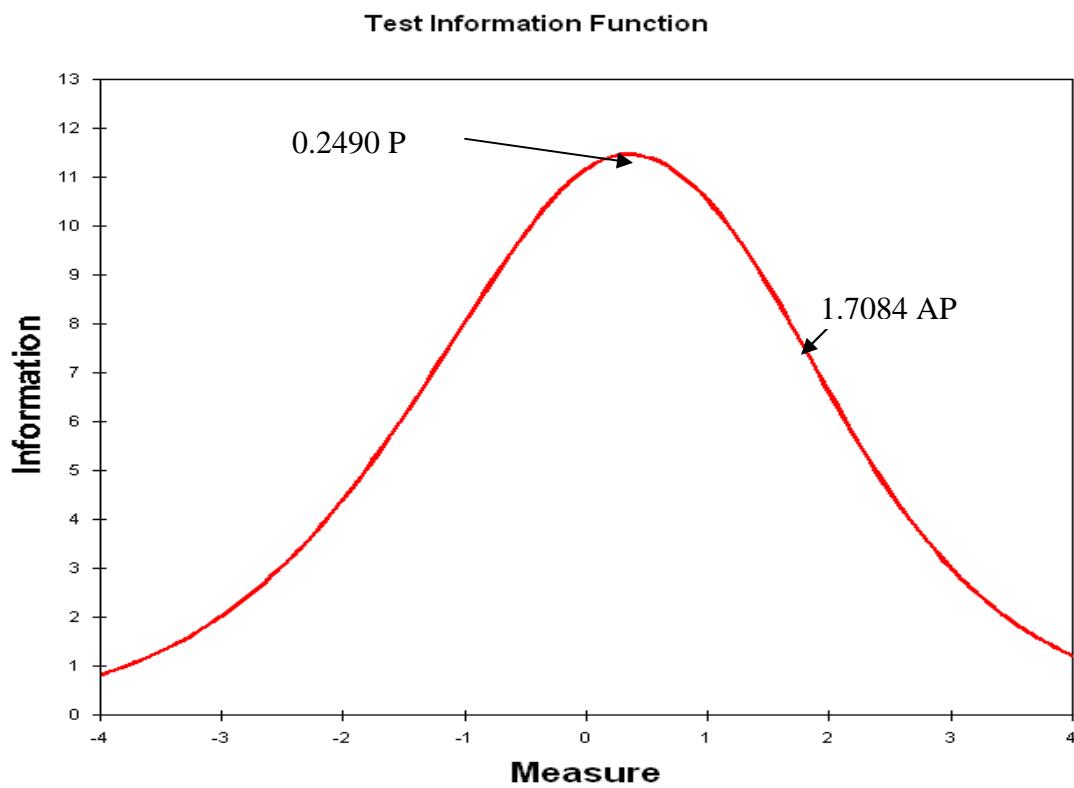


Figure 8.2.11: Grade 7 Math Test Information Function – Total Population

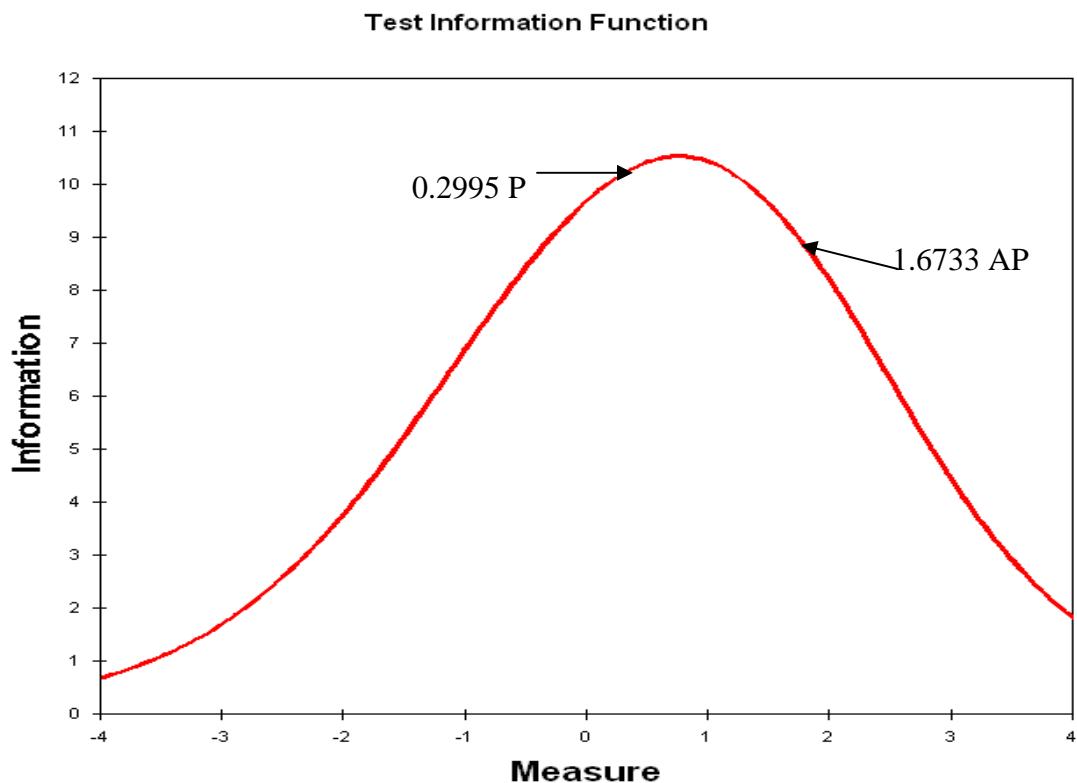


Figure 8.2.12: Grade 8 Math Test Information Function – Total Population

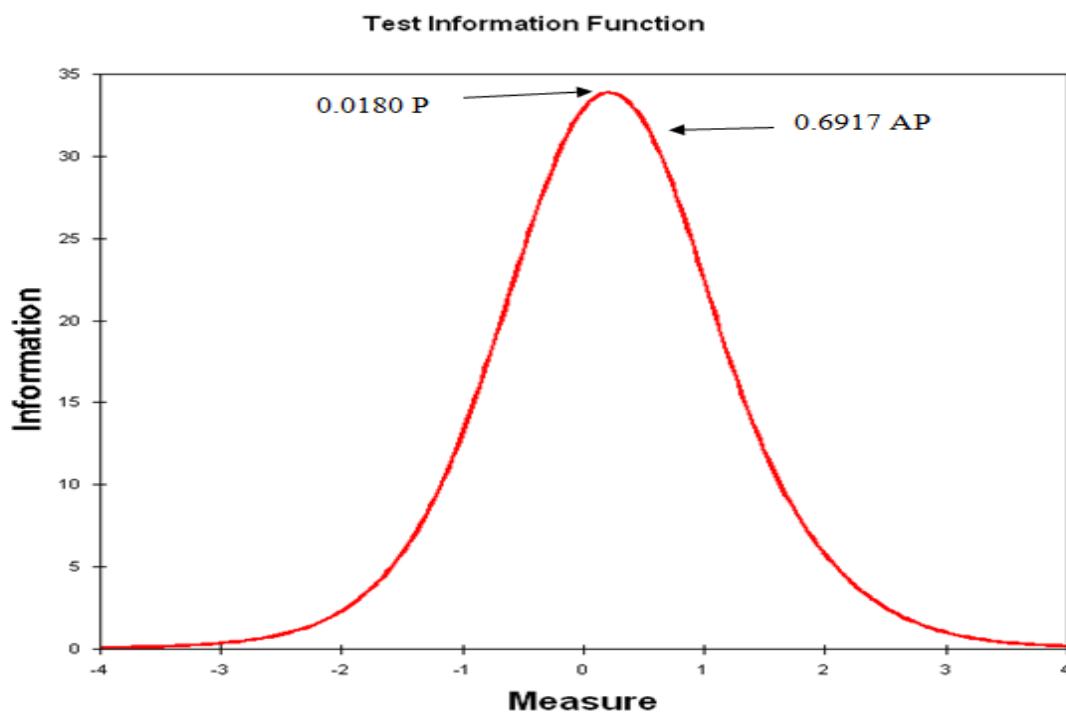


Figure 8.2.13: Grade 4 Science Test Information Function – Total Population

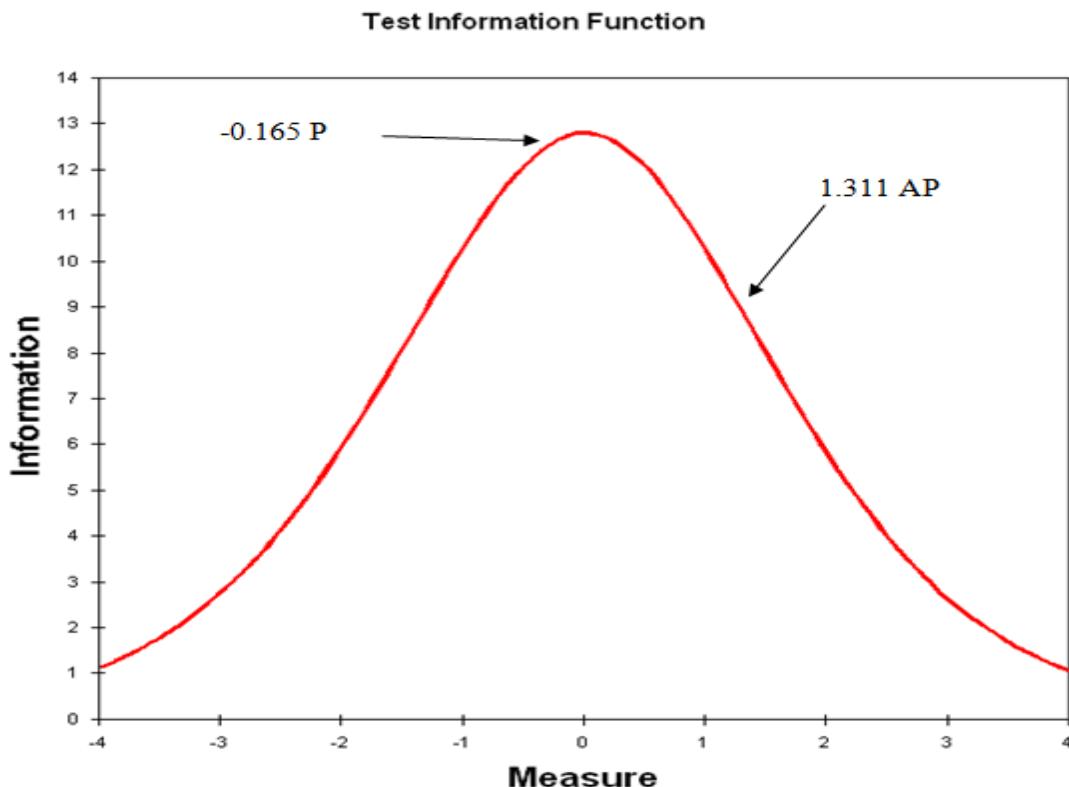


Figure 8.2.14: Grade 8 Science Test Information Function – Total Population

8.3 Conditional Estimate of Error at Each Cut-Score

The NJ ASK 2011 3–8 raw cut scores and the corresponding conditional standard error of measurement (CSEM) are summarized in Table 8.3.1. WINSTEPS calculates the standard error at each score point using item response theory and the information function. The equation for the standard error at each value of theta (ability) is given by

$$SE(\hat{\theta}) = \frac{1}{\sqrt{I(\theta)}}$$

where $I(\theta)$ is the information function for a test at θ . For the Rasch model, the information provided by a test at θ is the sum of the item information functions at θ . Interpolation of the raw cut scores were used to derive the CSEM from the standard error associated with the theta at each cut score.

Table 8.3.1: Raw Score Cut Scores with Conditional Standard Error of Measurement

		LAL		Mathematics		Science	
		Advanced		Advanced		Advanced	
		Proficient	Proficient	Proficient	Proficient	Proficient	Proficient
Grade 3	Cut score (CSEM)	25 (2.51)	36 (1.88)	24 (3.44)	38 (3.02)	N/A	N/A
Grade 4	Cut score (CSEM)	32 (2.78)	44 (2.05)	24 (3.37)	39 (2.89)	16 (2.86)	27 (2.68)
Grade 5	Cut score (CSEM)	33 (3.16)	48 (2.44)	23 (3.29)	38 (2.85)	N/A	N/A
Grade 6	Cut score (CSEM)	39 (3.34)	55 (2.53)	22 (3.36)	39 (3.21)	N/A	N/A
Grade 7	Cut score (CSEM)	39 (3.36)	53 (2.83)	24 (3.36)	39 (2.80)	N/A	N/A
Grade 8	Cut score (CSEM)	35 (3.40)	55 (2.48)	21 (3.18)	35 (3.02)	25 (3.54)	42 (2.98)

8.4 Rater Reliability

Tables 8.4.1–8.4.6 show the percentages of writing tasks and constructed-response items scored with exact agreement, adjacent agreement, and resolution needed by grade level and content area. Raters used scoring rubrics with a score range of 0 to 5 for the grades 3–5 writing prompt, and 0 to 6 for the grade 6, 7, and 8 writing prompts. For grades 3 through 5, the scores for both writing prompts were doubled; whereas, in grades 6–8 the *Persuasive* writing prompt scores were doubled, and the *Explanatory* writing prompt scores were not doubled in data analyses and score reporting. The rubrics had score points that ranged from 0 to 4 for the LAL OE items and from 0 to 3 for the mathematics and science CR items. There were no half points assigned for any of the CR items or the writing prompts.

Ten percent (10%) of the writing prompts and the constructed-response items in all content areas were read by a second rater. The purpose of the second-reading for the constructed-response items was to investigate the consistency between raters for the NJ ASK 2011. As shown in the tables below, the exact agreement rates ranged from 69.3% to 96.6% at the test level. An adjacent score is a score assigned by the second rater that is no more than ± 1 score point from the score assigned by the first rater. The adjacent agreement rates ranged from 3.1% to 29.4%. In no case did more than 2% of the scores require resolution by a third rater.

Table 8.4.1: Grade 3 Scoring Consistency of WT and CR Items*

	% Raters in Exact Agreement	% Raters in Adjacent Agreement	% Resolution Needed
LAL Total	74.4	25.0	0.4
Writing Total	67.2	31.9	0.6
Writing Task 1	69.6	29.4	0.4
Writing Task 2	64.7	34.4	0.8
Reading Total	79.2	20.4	0.2
CR 1	77.8	22	0.2
CR 2	80.6	19	0.0
CR 3	79.3	20.2	0.4
Math Total	96.1	3.4	0.4
ECR Total	90.6	8.1	1.1
ECR 1	90.9	8.0	0.8
ECR 2	93.4	5.2	1.2
ECR 3	87.4	11.0	1.4
SCR Total	98.8	1.1	0.0
SCR 1	99.2	0.8	0.0
SCR 2	98.4	1.6	0.0
SCR 3	99.4	0.6	0.0
SCR 4	98.9	1.0	0.0
SCR 5	98.9	1.0	0.0
SCR 6	98.5	1.4	0.0

* WT= Writing Tasks, CR= Constructed Response

Table 8.4.2: Grade 4 Scoring Consistency of WT and CR Items*

	% Raters in Exact Agreement	% Raters in Adjacent Agreement	% Resolution Needed
LAL Total	73.0	26.0	0.8
Writing Total	65.8	33.3	0.7
Writing Task 1	65.6	33.4	0.8
Writing Task 2	65.9	33.2	0.6
Reading Total	77.9	21.1	0.9
CR 1	77.1	22.0	0.8
CR 2	82.2	17.4	0.2
CR 3	74.3	24.0	1.6
Math Total	96.6	3.1	0.2
ECR Total	92.0	7.3	0.6
ECR 1	90.5	8.4	0.8
ECR 2	91.5	7.8	0.6
ECR 3	93.9	5.6	0.4

	% Raters in Exact Agreement	% Raters in Adjacent Agreement	% Resolution Needed
SCR Total	99.0	1.0	0.0
SCR 1	99.0	0.8	0.0
SCR 2	99.5	0.4	0.0
SCR 3	98.4	1.6	0.0
SCR 4	98.8	1.2	0.0
SCR 5	98.8	1.2	0.0
SCR 6	99.2	0.8	0.0
Science Total	81.2	17.2	1.4
CR 1	78.2	20.2	1.4
CR 2	84.2	14.2	1.4

* WT= Writing Tasks, CR= Constructed Response

Table 8.4.3: Grade 5 Scoring Consistency of WT and CR Items*

	% Raters in Exact Agreement	% Raters in Adjacent Agreement	% Resolution Needed
LAL Total	73.1	26.3	0.4
Writing Total	67.2	31.9	0.7
Writing Task 1	70.7	28.8	0.4
Writing Task 2	63.7	35.0	1.0
Reading Total	77.0	22.6	0.2
CR 1	77.3	22.4	0.2
CR 2	80.2	19.6	0.0
CR 3	73.6	25.8	0.4
Math Total	96.2	3.5	0.2
ECR Total	89.2	9.9	0.7
ECR 1	90.2	8.6	1.0
ECR 2	85.5	13.2	1.2
ECR 3	91.8	8.0	0.0
SCR Total	98.8	1.1	0.0
SCR 1	98.6	1.4	0.0
SCR 2	99.0	0.8	0.0
SCR 3	98.2	1.8	0.0
SCR 4	98.7	1.2	0.0
SCR 5	98.5	1.2	0.0
SCR 6	99.0	1.0	0.0
SCR 7	99.1	0.8	0.0
SCR 8	99.3	0.6	0.0

* WT= Writing Tasks, CR= Constructed Response

Table 8.4.4: Grade 6 Scoring Consistency of WT and CR Items*

	% Raters in Exact Agreement	% Raters in Adjacent Agreement	% Resolution Needed
LAL Total	71.1	27.8	1.0
Writing Total	65.7	32.9	1.4
Writing Task 1	67.2	31.8	1.0
Writing Task 2	64.1	34.0	1.8
Reading Total	73.8	25.3	0.8
CR 1	73.5	25.6	0.8
CR 2	69.8	29.2	1.0
CR 3	79.1	20.4	0.4
CR 4	72.9	26.0	1.0
Math Total	95.5	3.9	0.4
ECR Total	85.7	12.4	1.6
ECR 1	84.8	12.8	2.0
ECR 2	80.6	17.4	1.8
ECR 3	91.8	7.0	1.0
SCR Total	99.2	0.7	0.0
SCR 1	99.0	1.0	0.0
SCR 2	99.1	0.8	0.0
SCR 3	99.3	0.6	0.0
SCR 4	99.3	0.6	0.0
SCR 5	99.5	0.4	0.0
SCR 6	99.3	0.6	0.0
SCR 7	99.2	0.6	0.0
SCR 8	98.7	1.2	0.0

* WT= Writing Tasks, CR= Constructed Response

Table 8.4.5: Grade 7 Scoring Consistency of WT and CR Items*

	% Raters in Exact Agreement	% Raters in Adjacent Agreement	% Resolution Needed
LAL Total	69.3	29.4	1.2
Writing Total	59.4	38.2	2.3
Writing Task 1	57.1	39.8	3.0
Writing Task 2	61.6	36.6	1.6
Reading Total	74.3	25.0	0.6
CR 1	72.4	27.0	0.6
CR 2	82.0	17.4	0.4
CR 3	69.6	29.8	0.6
CR 4	73.2	25.8	0.8

	% Raters in Exact Agreement	% Raters in Adjacent Agreement	% Resolution Needed
Math Total	95.6	3.9	0.3
ECR Total	86.7	12.1	1.2
ECR 1	91.5	8.0	0.4
ECR 2	82.4	15.2	2.4
ECR 3	86.1	13.0	0.8
SCR Total	99.0	0.9	0.0
SCR 1	98.6	1.2	0.0
SCR 2	99.1	0.8	0.0
SCR 3	99.3	0.4	0.0
SCR 4	98.8	1.0	0.0
SCR 5	99.1	0.8	0.0
SCR 6	99.2	0.8	0.0
SCR 7	99.4	0.4	0.0
SCR 8	98.5	1.4	0.0

* WT= Writing Tasks, CR= Constructed Response

Table 8.4.6: Grade 8 Scoring Consistency of WT and CR Items*

	% Raters in Exact Agreement	% Raters in Adjacent Agreement	% Resolution Needed
LAL Total	70.0	29.3	0.7
Writing Total	67.8	31.3	0.9
Writing Task 1	67.4	31.8	0.8
Writing Task 2	68.2	30.8	1.0
Reading Total	71.1	28.3	0.6
CR 1	71.9	27.8	0.4
CR 2	71.1	28.4	0.4
CR 3	72.0	27.4	0.4
CR 4	69.2	29.4	1.2
Math Total	96.2	3.3	0.2
ECR Total	88.6	10.3	0.9
ECR 1	86.9	12.2	0.6
ECR 2	89.2	9.2	1.4
ECR 3	89.7	9.4	0.6

	% Raters in Exact Agreement	% Raters in Adjacent Agreement	% Resolution Needed
SCR Total	99.1	0.7	0.0
SCR 1	98.5	1.4	0.0
SCR 2	99.2	0.6	0.0
SCR 3	99.4	0.4	0.0
SCR 4	98.7	1.2	0.0
SCR 5	99.3	0.4	0.0
SCR 6	99.4	0.6	0.0
SCR 7	99.2	0.6	0.0
SCR 8	99.2	0.6	0.0
Science Total	84.9	14.0	0.9
CR 1	84.0	15.2	0.6
CR 2	85.7	12.8	1.2

* WT= Writing Tasks, CR= Constructed Response

PART 9: VALIDITY

The *Standards for Educational and Psychological Testing* states, “Ultimately, the validity of an intended interpretation of test scores relies on all the available evidence relevant to the technical quality of a testing program. This includes evidence of careful test construction; adequate score reliability; appropriate test administration and scoring; accurate score scaling, equating, and standard setting; and careful attention to fairness for all examinees” (p. 17).⁴⁷ While this section summarizes evidence supporting claims as to the validity of NJ ASK performance scores, many parts of this technical report provide appropriate evidence for validity. Given the procedural and empirical evidence available and the rationale presented below, valid performance standards-based interpretations and uses of the scores are generally supported.

The following section begins with a review of important federal statutes requiring the NJ ASK 3–8 and explains the purposes and intended uses of performance test scores, suggesting the value implications of performance scores for schools, teachers, students, and parents. Content-related evidence supporting validity is presented in terms of the adequacy and appropriateness of the state content standards and the representation of the content standards on the tests. Then, validity evidence based on the internal structure of NJ ASK is provided through a correlational analysis of NJ ASK content clusters with each other. Reference to specific Standards within the *Standards for Educational and Psychological Testing* are provided where appropriate.

9.1 Content and Curricular Validity⁴⁸

Content validity of a test refers to the degree to which the content of a test is congruent with the purpose of testing, as defined by the curriculum. Baker and Linn (2002)⁴⁹ suggest that “Two questions are central in the evaluation of content aspects of validity. Is the definition of the content domain to be assessed adequate and appropriate? Does the test provide an adequate representation of the content domain the test is intended to measure?” (p. 6). The following two sections help answer these two very important questions and also address Standard 1.6 of the *Standards for Educational and Psychological Testing*.

Appropriateness of Content Definition

In 1996, the New Jersey State Board of Education adopted the New Jersey Core Curriculum Content Standards, an ambitious framework for educational reform in the State’s public schools. New Jersey’s standards were created to improve student achievement by clearly defining what all students should know and be able to do at the end of thirteen years of public education. Since the adoption of those standards, the NJ DOE has continuously engaged in discussions with educators, business representatives, and national experts about the impact of the standards on classroom

⁴⁷ American Educational Research Association, American Psychological Association, and National Council on Measurement in Education. (1999). *Standards for Educational and Psychological Testing*. Washington: APA.

⁴⁸ Standard 1.6 – When the validation rests in part on the appropriateness of test content, the procedures followed in specifying and generating test content should be described and justified in reference to the construct the test is intended to measure or the domain it is intended to represent. If the definition of the content sampled incorporates criteria such as importance, frequency, or criticality, these criteria should also be clearly explained and justified (page 18).

⁴⁹ Baker, E. L., & Linn, R. L. (2002). Validity Issues for Accountability Systems. Center for the Study of Evaluation. Technical Report 585, Los Angeles, CA.

practices. To assist teachers and curriculum specialists in aligning curriculum with the standards, the NJ DOE provided local school districts with a curriculum framework for each content area. The frameworks provided classroom teachers and curriculum specialists with sample teaching strategies, adaptations, and background information relevant to each of the content areas.

The review process required by the State Board involved teachers, school administrators, students, parents, and representatives from business, higher education, and the community. In addition, several content areas were reviewed by Achieve, Inc., and the Council of Chief State School Officers (CCSSO). In response to this unprecedented review, the 2004 New Jersey Core Curriculum Content Standards provide the level of specificity and depth of content that better prepares students for post secondary education and employment. The standards are based on the latest research in each of the content areas and identify the essential core of learning for all students.

Since the adoption of the original 1996 New Jersey Core Curriculum Content Standards (CCCS), the New Jersey State Board of Education approved administrative code that implements all aspects of standards-based reform. N.J.A.C. 6A:8 requires districts to align all curriculum to the standards; ensure that teachers provide instruction according to the standards; ensure student performance is assessed in each content area; and provide teachers with opportunities for professional development that focuses on the standards.

Adequacy of Content Representation

The content-related evidence of validity includes the extent to which the test items represent these specified content domains and cognitive dimensions. Adequacy of the content representation of the NJ ASK is critical because the tests must provide an indication of student progress toward achieving the knowledge and skills identified in the CCCS, and the tests must fulfill the requirements under NCLB.

Adequate representation of the content domains defined in the CCCS is assured through use of a test blueprint and a responsible test construction process. New Jersey performance standards, as well as the CCCS, are taken into consideration in the writing of multiple-choice and constructed-response items and constructed-response rubric development. Each test must align with and proportionally represent the sub-domains of the test blueprint. Evidence to support the above is described in Part 2, Test Development Process, and Part 6, Item and Test Statistics. Part 2 provides evidence that the NJ test specifications were followed in the development of test items; alignment of items with the CCCS; and the review of items by NJ content experts, teachers, and Sensitivity committee. Item writers were recruited with specific qualifications and were trained and validated before they started writing items. Tables 2.1.3 through 2.1.21 in Part 2 provide a comparison of target test construction maps to actual test maps for LAL, mathematics, and science. The tables indicate that the target blueprint representation in terms of number of items and score points for each sub-domain was adequately met.

The CCCS are represented on each test by balancing sub-domain coverage on each test, by proportionally representing items corresponding to Partially Proficient, Proficient, and Advanced Proficient performance categories on each test, and by matching item format to the requirements of the content and standards descriptions.

Adherence to Test Specification

MI followed statistical and content specifications to make sure that the 2011 NJ ASK assessments are valid. The statistical specification described the psychometric characteristics of the items included in the 2011 assessments. The primary statistical targets used for NJ ASK test assembly were the p-value estimates also called proportion correct or item difficulty, the point bi-serial correlation which is a measure of how well the items discriminate among test takers and is related to the overall reliability of the test, and proportion correct value which is an indication of test difficulty. Similarly, the minimum target value for a proportion-correct was set at 0.25 and maximum was set at 0.95. In addition, content experts made sure that the items selected for the 2011 NJ ASK tests were free from poor model fit and differential item functioning when they were first field tested.

Content specification pertains to the adherence to content representation across content standards and sub-domains. MI developed all test items to conform to the NJ ASK content standards and test blueprints. Part 2 of this document describes test development activities of the NJ ASK assessments. The actual test maps for NJ ASK are shown in Tables 2.1.3 through 2.1.21 and the 2011 tests configurations are shown in Tables 2.1.1 and 2.1.2. The Tables indicate that the 2011 assessments adequately adhere to the test blueprints.

Qualified item writers who were familiar with the NJ state specifications and populations were recruited and trained for item writing. Detail procedures are described in Part 2 of this document. The items were reviewed by NJ's content review committee and sensitivity review committee comprised of NJ teachers making sure that the items align with the state standards and are free from bias for a specific group of student population. Only items accepted from the committees were added to the bank for possible use in future operational tests.

Test Administration and Accommodations

Part 3 of this report describes the test administration process. In order to securely administer the tests the test administrator were trained on the process and test co-coordinator manuals were produced for the step by step process. A test form distribution list was prepared for the proportional representation of DFG prior to the test administration. Tests were administered under standard condition. For the case where the standard condition was compromised or breached a separate alternate form was developed for each grade and content area. The alternate test forms matched test blueprint and difficulty of the regular tests.

The tests were also translated into large print and Braille, and a separate Spanish version of the test was developed for state approved accommodations for LEP. Similarly, various accommodations (see Appendix C for the list of accommodations) were offered for students identified by IEP and 504 plans to minimize assessment ambiguity and inaccuracy.

9.2 Construct Validity⁵⁰

Because the NJ ASK testing program assesses student performance in several content areas using a variety of testing methods, it is important to study the pattern of relationships among the content areas and testing methods. Therefore, this section addresses evidence based on responses and internal structure. One method for studying patterns of relationships to provide evidence supporting the inferences made from test scores is the multi-trait matrix. Tables 6.3.1 through 6.3.6 summarize Pearson correlation coefficients among test content domains and clusters by grade level. The correlations between clusters within a content area were generally found to be higher than the correlations between clusters across the content areas.

Scaling and Performance Score Reporting

The NJ ASK 3–8 are scaled in several ways: raw score points, Item Response Theory (IRT), and performance standard level (based on scale-score cuts). New Jersey actively promotes the use of performance level results, reporting them annually on each content test at the student, school, district and state levels. Individual student and average scale scores are also used, but should play a secondary role, generally interpreted with reference to their distance from performance-score cut points. Test results are reported for students as a whole as well as by student group including sex, ethnicity, disability, English language proficiency, migrant status, and DFG. Scores are reported to schools and districts in the annually published reports (see Part 10: Reporting).

NJ ASK performance scores indicate that an individual student performs at the Partially Proficient, Proficient, and Advanced Proficient level in a content area. Performance standard descriptions associated with each level provide details of the performance that students have met or exceeded. No stakes for students or teachers are attached by the state to student-level scores. Teachers are counseled to interpret individual student scores only in the context of other assessment results and their own experience.

9.3 Criterion-Related Validity

Validity evidence related to other Standards is listed below:

Standard 1.5⁵¹

- The composition of the sample of examinees from which validity evidence was obtained is described in detail in Part 6 – Item and Test Statistics, including major relevant sociodemographic characteristics. This information is imbedded within the Tables of Part 6. These tables also provide descriptive statistics for number correct raw score and for

⁵⁰ Standard 1.11 – If the rationale for a test use or interpretation depends on premises about the relationships among parts of the test, evidence concerning the internal structure of the test should be provided.

Standard 1.12 – When interpretation of subscores, score differences, or profiles is suggested, the rationale and relative evidence in support of such interpretation should be provided. Where composite scores are developed, the basis and rationale for arriving at the composites should be given.

⁵¹ Standard 1.5 - The composition of any sample of examinees from which validity evidence is obtained should be described in as much detail as is practical, including major relevant sociodemographic and developmental characteristics.

scale scores. Statistics include N-counts, means, standard deviations, minimum and maximum values, and a variety of data disaggregations, including student demographic group and DFG.

Standard 1.7⁵²

- Standard setting procedures, including the selection process and the characteristics of judges, is described in detail in Part 5.
- The NJ ASK 2011 3–8 constructed-response items and writing responses required hand scoring. The processes of selecting and training scorers, reading and scoring papers, and monitoring scoring are described in detail in Part 4.

Standard 1.13⁵³

- The conditions under which the data were collected are described in Part 2. Information about the administration of NJ ASK is available in the *New Jersey Assessment of Skills & Knowledge Spring 2011 Test Coordinator Manual Grades 3–8* which can be found at <https://www.measinc.com/nj/NJASK/Default.aspx>

⁵² Standard 1.7 – When a validation rests in part on the opinions or decisions of expert judges, observers, or raters, procedures for selecting such experts and for eliciting judgments or ratings should be fully described. The qualifications, and experience, of the judges should be presented. The description of procedures should include any training and instructions provided, should indicate whether participants reached their decisions independently, and should report the level of agreement reached. If participants interacted with one another or exchanged information, the procedures through which they may have influenced one another should be set forth.

⁵³ Standard 1.13 - When validity evidence includes statistical analyses of test results, either alone or together with data on other variables, the conditions under which the data were collected should be described in enough detail that users can judge the relevance of the statistical findings to local conditions. Attention should be drawn to any features of a validation data collection that are likely to differ from typical operational testing conditions and that could plausibly influence test performance.

PART 10: REPORTING

Previously, scores were reported in two cycles. Data for Cycle I reporting were produced after districts submit record changes. Data for Cycle II reporting were produced after the completion of automatic rescoreing of the constructed-response items and writing tasks.

Beginning in 2011, only one reporting cycle was used. Reports were produced after districts submitted record changes and the automatic rescoreing of the constructed response items and writing tasks were completed.

10.1 Reports

While there is only one reporting cycle currently, the same reports were produced as in previous years, with one exception. The Preliminary Performance by Demographic Group –School and District are no longer produced.

The following reports were produced separately for each grade.

- Student Sticker (1 per student)
- Individual Student Report (ISR) (2 per student)
- Student Roster – Science (Grade 8 only)
- Student Roster – Mathematics
- Student Roster – Language Arts Literacy
- All Sections Roster
- Performance by Demographic Group –School
- Performance by Demographic Group –District
- Cluster Means Report

Brief descriptions of each report can be found in the 2009 NJ ASK Technical Report (PTM 1507-34), Part 10, Section 10.1

10.2 State Summary Reporting

The state summary data file contains the same type of test results based on the performance by demographics reports at the state, district, and school levels. This data file is available in text and in Excel formats and is posted on the NJ DOE's Web site.

(<http://www.nj.gov/education/schools/achievement/>)

APPENDIX A

Field Test Form Distribution Plan

Table A.1: NJ ASK 2011 Grade 3 Test Form Distribution Plan

Form	DFG¹													Grand Total
	A	B	CD	DE	FG	GH	I	J	N	O	R	S	V	
A	1072	751	950	940	720	640	380	40			40	20		5553
B	1318	90	100	380	550	660	2619	140			130	20		6007
C	440	1767	1031	461	580	419	520	180			90	20		5508
D	501	1415	150	386	690	810	1998	120			140	0		6210
E	1976	180	330	690	180	630	1791	120	30		90	20	0	6037
F	1923	110	80	30	100	1250	2080	50			60	0		5683
G	910	460	780	480	608	1098	1110	90			0	20		5556
H	640	648	410	711	960	870	730	420			110	0		5499
J	450	839	621	531	620	1310	830	429			410	52		6092
K	861	420	500	550	710	640	1271	789			70	30		5841
L	671	660	700	920	909	731	160	520			120	20		5411
M	1041	110	440	740	1151	830	1291	120			70	30		5823
N	1561	380	491	1070	820	681	670	130			60	20		5883
O	899	681	440	951	820	709	822	100			300	20		5742
P	641	1140	1170	400	591	899	390	70	509			110		5920
R	1270	560	590	1179	920	490	799	210			71	40	51	6180
S	690	420	550	690	749	790	750	190			320	120	30	5299
T	559	500	370	540	801	1060	1140	380			260	50		5660
U	1848	300	50	1389	640	679	620	200			250	0		5976
V	941	440	609	511	732	580	971	520			190	90	40	5644
W	1102	590	710	920	770	0	930	271			80	40	20	5433
X	801	580	480	1277	712	720	1140	90			90	0		5890
Grand Total	22115	13041	11552	15746	15333	16496	23012	5179	539	1261	2140	413	20	126847

¹DFG, or district factor group, is a district-level socioeconomic measure based upon 2000 U.S. Census data, with A referring to districts at the lowest end and J at the highest end. N = districts with too low a percentage of students in public schools for a DFG value to be assigned. O and S = schools receiving special populations. R = charter school. V= vocational school

Table A.2: NJ ASK 2011 Grade 4 Test Form Distribution Plan

Form	DFG¹													Grand Total
	A	B	CD	DE	FG	GH	I	J	N	O	R	S	V	
A	1052	791	1011	940	719	660	360	70		40	20			5663
B	1340	90	100	330	550	740	2630	110		130	20			6040
C	450	1671	1101	461	540	452	581	190		90	20			5556
D	430	1267	150	387	610	760	2151	100		140	0			5995
E	1789	170	320	690	190	609	1740	110	20		100	20	0	5758
F	1819	120	70	30	90	1310	2123	50			60	0		5672
G	920	490	709	580	591	1109	981	80			30	0		5490
H	649	619	420	730	979	899	800	480			110	0		5686
J	450	858	650	530	650	1281	890	422			370	20		6121
K	799	420	520	560	761	679	1211	810			70	40		5870
L	690	610	719	920	951	749	150	520			110	20		5439
M	1050	170	409	710	1241	841	1310	110			110	30		5981
N	1542	330	500	1099	870	731	680	120			60	20		5952
O	789	640	400	769	810	780	801	100			280	30		5399
P	621	1060	1110	450	630	939	361	50	491			100		5812
R	1160	530	609	1171	960	470	340	211			60	0	51	5562
S	661	431	601	691	730	800	850	160			310	120	40	5394
T	589	430	439	511	910	1020	1120	330			260	50		5659
U	1761	310	60	1420	651	692	649	210			250	0		6003
V	941	420	569	490	672	691	950	530			210	90	40	5623
W	1061	589	740	940	731	0	1000	240			100	40	20	5461
X	760	550	470	1318	740	730	1160	100			140	0		5968
Grand Total	21323	12566	11677	15727	15576	16942	22838	5103	511	1330	2100	391	20	126104

¹DFG, or district factor group, is a district-level socioeconomic measure based upon 2000 U.S. Census data, with A referring to districts at the lowest end and J at the highest end. N = districts with too low a percentage of students in public schools for a DFG value to be assigned. O and S = schools receiving special populations. R = charter school. V= vocational school

Table A.3: NJ ASK 2011 Grade 5 Test Form Distribution Plan

Form	DFG¹													Grand Total
	A	B	CD	DE	FG	GH	I	J	N	O	R	S	V	
A	1229	661	939	931	751	630	390	50		100	20			5701
B	1033	80	100	391	550	709	2510	130		100	20			5623
C	410	1724	1071	420	620	440	550	210		80	20			5545
D	450	1168	140	397	640	700	2100	120		100	0			5815
E	1639	160	320	640	160	570	1651	0	30		70	20	0	5260
F	1794	120	70	30	90	1310	2111	50			50	0		5625
G	791	500	759	500	640	950	1081	90			50	20		5381
H	529	530	420	670	980	851	771	510			110	0		5371
J	401	780	500	490	700	1239	891	440			230	52		5723
K	740	350	510	590	750	630	1290	890			110	30		5890
L	631	569	690	950	930	680	190	521			110	20		5291
M	981	130	390	580	1110	920	1269	110			120	40		5650
N	1209	340	519	989	800	680	720	110			160	20		5547
O	690	610	440	899	841	809	820	120			200	20		5449
P	530	1080	1149	440	592	940	390	60	440			100		5721
R	949	500	550	1161	890	470	551	211		39	150	72		5543
S	510	430	541	660	781	770	850	190		340	120	40	20	5252
T	450	470	421	520	670	1000	1130	330		250	50			5291
U	1642	310	60	1508	610	659	640	200		240	210			6079
V	952	450	490	501	649	650	1011	491		270	120	50	20	5654
W	1021	540	1410	980	690	0	1010	230		170	110	20		6181
X	661	571	450	1248	760	730	970	90		150	60			5690
Grand Total	19242	12073	11939	15495	15204	16337	22896	5153	470	1459	2510	464	40	123282

¹DFG, or district factor group, is a district-level socioeconomic measure based upon 2000 U.S. Census data, with A referring to districts at the lowest end and J at the highest end. N = districts with too low a percentage of students in public schools for a DFG value to be assigned. O and S = schools receiving special populations. R = charter school. V= vocational school

Table A.4: NJ ASK 2011 Grade 6 Test Form Distribution Plan

Form	DFG¹													Grand Total
	A	B	CD	DE	FG	GH	I	J	N	O	R	S	V	
A	1198	670	840	940	770	690	400	70		100	20			5698
B	1012	90	110	370	580	710	2510	130		100	20			5632
C	410	1716	1042	400	630	440	480	170		100	20			5408
D	421	1106	140	397	700	740	2060	100		110	0			5774
E	1691	150	330	620	200	600	1650	140	30	190	20	30		5651
F	1660	140	80	30	80	1250	2050	0		40	0			5330
G	780	490	821	540	659	941	1090	90		100	20			5531
H	490	500	400	691	870	810	780	530		110	50			5231
J	420	820	500	560	640	1119	860	420		100	52			5491
K	740	330	480	600	760	670	1270	870		130	40			5890
L	570	609	760	940	841	750	190	510		110	20			5300
M	881	130	420	620	1110	810	1240	120		110	30			5471
N	1089	360	480	960	820	700	780	130		130	20			5469
O	821	480	420	899	810	780	820	110		140	20			5300
P	591	1020	1120	410	501	1000	360	40	430	100				5572
R	1030	530	561	1220	820	480	580	210		72	150	79		5732
S	529	420	590	640	780	730	830	180		370	100	50	20	5239
T	439	420	430	510	670	1000	1170	300		280	50			5269
U	1509	300	70	1480	650	650	680	180		270	200			5989
V	820	410	550	550	670	590	970	500		270	120	70	30	5550
W	930	580	810	960	769	0	930	250		150	110	20		5509
X	510	490	430	1241	690	770	1000	100		220	100			5551
Grand Total	18541	11761	11384	15578	15020	16230	22700	5150	460	1632	2500	551	80	121587

¹DFG, or district factor group, is a district-level socioeconomic measure based upon 2000 U.S. Census data, with A referring to districts at the lowest end and J at the highest end. N = districts with too low a percentage of students in public schools for a DFG value to be assigned. O and S = schools receiving special populations. R = charter school. V= vocational school

Table A.5: NJ ASK 2011 Grade 7 Test Form Distribution Plan

Form	DFG¹												Grand Total	
	A	B	CD	DE	FG	GH	I	J	N	O	R	S	V	
A	1177	700	1120	530	760	560	380	50		40	40			5357
B	1103	110	100	250	740	670	2370	140		120	20			5623
C	390	1927	970	400	670	410	520	220		100	20			5627
D	330	1070	140	410	950	660	2080	90		60	0			5790
E	1670	160	300	660	190	580	1510	140	30	190	20	30		5480
F	1762	130	70	30	90	1240	2161	0		40	0			5523
G	810	520	831	510	490	1010	1330	90		90	20			5701
H	540	890	310	440	910	840	740	480		100	50			5300
J	460	1210	540	320	700	1200	870	430		70	39			5839
K	770	360	460	530	780	600	1220	890		140	40			5790
L	690	590	480	1610	961	700	160	490		110	30			5821
M	860	140	420	650	1100	860	1300	120		110	30			5590
N	1050	330	490	1010	810	700	750	150		130	20			5440
O	780	500	470	950	1140	780	850	110		150	30			5760
P	511	990	1100	790	870	740	360	0	410	100				5871
R	980	180	920	1160	870	490	580	190		88	130	51		5639
S	530	390	620	680	830	809	820	180		530	100	50	20	5559
T	500	430	460	540	610	940	1170	290		280	50			5270
U	1592	250	50	1530	671	660	670	90		330	110			5953
V	760	410	580	641	510	460	930	480		270	120	90	30	5281
W	880	270	810	930	760	70	1320	420		160	110	20		5750
X	620	510	290	1229	680	750	981	80		330	190			5660
Grand Total	18765	12067	11531	15800	16092	15729	23072	5130	440	1988	2360	570	80	123624

¹DFG, or district factor group, is a district-level socioeconomic measure based upon 2000 U.S. Census data, with A referring to districts at the lowest end and J at the highest end. N = districts with too low a percentage of students in public schools for a DFG value to be assigned. O and S = schools receiving special populations. R = charter school. V= vocational school

Table A.6: NJ ASK 2011 Grade 8 Test Form Distribution Plan

Form	DFG¹													Grand Total
	A	B	CD	DE	FG	GH	I	J	N	O	R	S	V	
A	1238	670	1030	550	770	570	400	60			40	30		5358
B	1092	90	110	240	700	660	2730	150			110	20		5902
C	450	1957	980	430	660	440	500	180			110	71		5778
D	340	1113	150	380	970	680	2050	90			50	0		5823
E	1649	150	290	620	190	550	1450	110	20		200	20	40	5289
F	1772	130	80	40	80	1250	2080	0			40	0		5472
G	820	490	851	530	500	930	1340	90			90	0		5641
H	560	930	290	460	1020	820	820	480			110	50		5540
J	460	1240	500	350	710	1160	860	390			70	39		5779
K	780	390	520	490	720	640	1240	910			140	51		5881
L	670	600	500	1610	931	710	170	480			30	30		5731
M	920	140	450	650	1129	1040	1290	120			100	30		5869
N	989	360	440	1000	840	690	710	140			110	51		5330
O	810	510	440	1000	1160	810	860	110			130	30		5860
P	570	1050	1180	790	970	750	370	0	400		80			6160
R	960	220	900	1230	810	460	540	200			132	60	90	5602
S	410	390	600	890	860	799	870	190			560	110	60	5759
T	479	430	420	500	620	950	1090	330			310	50		5179
U	1628	260	60	1510	530	660	730	90			330	100		5898
V	819	400	570	621	500	460	960	500			320	130	99	5419
W	838	300	840	900	690	70	1280	470			200	120	20	5728
X	590	490	300	1220	660	810	960	100			350	190		5670
Grand Total	18844	12310	11501	16011	16020	15909	23300	5190	420	2202	2170	691	100	124668

¹DFG, or district factor group, is a district-level socioeconomic measure based upon 2000 U.S. Census data, with A referring to districts at the lowest end and J at the highest end. N = districts with too low a percentage of students in public schools for a DFG value to be assigned. O and S = schools receiving special populations. R = charter school. V= vocational school

APPENDIX B

CHECKLIST FOR FORMS DEVELOPMENT

Table B-1: Checklist for Forms Development

Item Data
Average Target Rasch value based on standard setting year*
As many items as possible have a p-value above 0.35 and below 0.90
As many items as possible have a pt. bis above 0.25
No item was used as a sample item.

* Targets are the theta cuts from the standard setting year.

Item Pool
For grades 6-8 one linking passage from the previous year's test was used.
All other passages were new to the operational test or had not been used operationally for several years.

Item Distribution
Item standards are distributed equally throughout the test
There are a variety of indicators assessed in each standard
MC items are generally in passage order, and OE items are at the end of the passage sets. WT items are in the appropriate places.
Answer key distribution is nearly equal between answer choices: A B C D
Having more than 2 MC items in a row with the same answer is avoided.

Name, Gender, and Ethnicity Distributions
Check gender distribution (number of passages or prompts which have a male and/or female): Male Female Both
Check ethnicity distribution (number of passages or prompts): Caucasian_Hispanic Asian_African American Other
There are NOT two or more items in the same session that have similar contexts.
There are NOT two or more items with similar answers or answer choices.
Sample items and test items do NOT clue each other.
Items do NOT have any fairness or sensitivity related to the names and contexts of the items.

APPENDIX C
**MODIFICATIONS OF TEST ADMINISTRATION PROCEDURES
FOR LIMITED ENGLISH PROFICIENT, SPECIAL EDUCATION
STUDENTS, AND STUDENTS ELIGIBLE UNDER SECTION 504
OF THE REHABILITATION ACT OF 1973**

Accommodations for Limited English Proficient (LEP) Students

NCLB prohibits exemptions from testing based on limited English proficient (LEP) status. As permitted by NCLB, Spanish forms of the test were available for LEP students whose dominant language was Spanish, as identified by school districts. For those LEP students who were tested in English, one or more of the following accommodations were permitted.

- Additional time up to 150% of the administration times indicated
- Translation of directions only to the student's native language.
- Translations of passages, items, prompts, and tasks are NOT permitted
- Use of a bilingual dictionary, preferably one normally used by the student as part of the instructional program.

Accommodations for Special Education students, and students eligible under section 504

In accordance with the Individuals with Disabilities Education Act (IDEA), students who are receiving special education services must participate in each subject area of the age-appropriate statewide assessment with the following exception:

Students with disabilities shall participate in the Alternate Proficiency Assessment in each content area where the nature of the student's disability is so severe that the student is not receiving instruction in any of the knowledge and skills measured by the general statewide assessment and the student cannot complete any of the types of questions on the assessment content area(s) even with accommodation and modifications. (New Jersey Administrative Code Chapter 6A:14-4.11[a]2)

Districts may use modifications of test administration procedures when administering the NJ ASK to special education students or to students eligible under Section 504 of the Rehabilitation Act of 1973. Decisions about participation and accommodations/modifications are made by the Individualized Education Program (IEP) or 504 team. Information about test content and item types from the test specifications booklets can be used to make this determination. Modifications in the areas listed below may be used separately or in combination.

Any accommodations or modifications of test administration procedures for students eligible for special education under the IDEA or eligible under Section 504 of the Rehabilitation Act of 1973 must be specified in the student's IEP or 504 accommodation plan. Accommodations or modifications must be consistent with the instruction and assessment procedures used in the student's classroom. Students eligible for modifications under Section 504 may not be classified but do have a permanent or temporary impairment in a major life function (for example: performing manual tasks, walking, seeing, hearing, speaking, etc.).

ACCEPTABLE ACCOMMODATIONS OR MODIFICATIONS

Code

A. Setting Accommodations

1. Administering the assessment:
 - a. individually in a separate room
 - b. in a small group in a separate room
 - c. in the resource room
 - d. in a special education classroom
 - e. using carrels
 - f. at home or in a hospital (this depends on the nature of the assessment task)
2. Seating the student in the front of the room near the examiner or proctor
3. Seating the student facing the examiner or proctor
4. Providing special lighting
5. Providing special furniture (e.g., desks, trays, carrels)

B. Scheduling Accommodations

1. Adding time as needed
2. Providing frequent breaks
3. Terminating a section of the test when a student has indicated that he/she has completed all the items he/she can. The test examiner must ensure that the student has attempted all items in a section since items are not ordered by difficulty. When this accommodation is used, the test must be administered in a small group or individually to avoid distraction.

C. Test Materials Modifications

1. Administering the large-print version of test materials
2. Administering the Braille version of test materials

D. Test Procedures Modifications

1. Administration modifications
 - a. reading directions aloud
 - b. reading test items (not reading passages) aloud
 - c. providing and ensuring that amplification (hearing aid and/or FM system) is in working order
 - d. using a sign language or cued speech interpreter for administration of directions or items but not reading passages
 - e. masking a portion of the test booklet and/or answer folder to eliminate visual distractors or providing reading windows
 - f. repeating, clarifying, or rewording directions
 - g. providing written directions on a separate sheet or transparency
 - h. using an examiner who is familiar with the student
 - i. using an examiner who can communicate fluently in sign language

- (American Sign Language or a form of Manually Coded English)
- j. providing manipulatives for math items
 - k. using graph paper for math section
 - l. using a Braille ruler and talking calculator
 - m. using tactile or visual cues for deaf or hard of hearing students to indicate time to begin, time remaining, and time to end a particular part of the test

2. Response modifications

- a. having an examiner record the student's identifying information on the answer folder, or grid corrections to the pre-ID label
- b. dictating oral responses to a scribe (person who writes from dictation) – student must indicate all punctuation and must spell all key words
- c. using a Braille writer to record responses
- d. signing responses to a sign language interpreter (student must indicate all punctuation and must spell all key words)
- e. recording responses on a word processor
- f. using large-face calculators
- g. using talking calculators
- h. providing an Augmentative Communication device
- i. using a larger diameter or modified special grip #2 pencil
- j. masking portions of the answer folder to eliminate visual distractors
- k. marking answers in the test booklet (an examiner would transfer the answers to an answer folder)
- l. Allowing separate additional continuation pages for writing tasks. These pages MUST be properly marked to link them to the correct student for credit.

OTHER CONSIDERATIONS

Ensure that:

- a. any medication has been appropriately adjusted to prevent interference with the student's functioning.
- b. eyeglasses are used, if needed.
- c. hearing aids, FM systems, Augmentative Communication devices, word processors, or other equipment are functioning properly.
- d. source and strength of light are appropriate.
- e. all students can clearly see and hear the examiner.
- f. all deaf or hard of hearing students who communicate aurally/orally are watching the examiner when instructions are given.
- g. responses to CR items and writing tasks which are written or typed on separate sheets of paper by students eligible for this accommodation are labeled with student data paper-clipped to the front of the answer folder, and placed in the fluorescent orange envelope provided. Copies of these pages should be made and retained on file by the school district until scores are received.

- h. students using the large-print test booklets
 - 1. mark their answers in the large-print answer folder. All responses must be transcribed into the regular answer folder provided in the large print kit.
 - 2. may be instructed to skip items identified in the LP instructions. The spaces for these items must be left blank on the student's answer folder (included in the large-print kit).
 - 3. who dictate responses on CR items and writing tasks indicate all punctuation and spell all key words.
- i. students using the Braille test booklets
 - 1. are instructed to bring a Braille ruler and a talking calculator to the test session.
 - 2. are instructed to skip dropped items identified in the Braille instructions. The spaces for these items must be left blank on the student transcription answer folder (included in the Braille kit).
 - 3. have answer folders transcribed from the Braille version by the examiner.
 - 4. dictate their answers to the examiner or use a device that produces Braille. For dictations and responses recorded in Braille:
 - Students must indicate all punctuation and must spell all key words.
 - Examiners must transcribe the Braille responses into the regular answer folder included in the Braille kit.
- j. students who communicate in sign language
 - 1. have an interpreter to translate oral directions and test items (but not the Reading passages in the Language Arts Literacy section of the test). The interpreter should be able to communicate in the mode used by the student, American Sign Language or a form of Manually Coded English. The interpreter should be instructed to interpret so as not to give the answer to the student through the use of a particular sign or finger spelling.
 - 2. using American Sign Language for CR and writing task responses will sign the responses to the interpreter who will interpret them into spoken English and a scribe will record the responses in the answer folder.
 - 3. using Signed English or cued speech will sign/cue to the interpreter who will transliterate (word for word) into spoken English and a scribe will record the responses.

APPENDIX D

SCORING RUBRICS

Scoring Rubrics

Table D.1: New Jersey Registered Holistic Scoring Rubric Grades 3 - 5

In scoring, consider the grid of written language	Inadequate Command	Limited Command	Partial Command	Adequate Command	Strong Command
Score	1	2	3	4	5
Content and Organization	May lack opening and/or closing	May lack opening and/or closing	May lack opening and/or closing	Generally has opening and/or closing	Opening and closing
	Minimal response to topic; uncertain focus	Attempts to focus May drift or shift focus	Usually has single focus	Single focus	Single focus Sense of unity and coherence Key ideas developed
	No planning evident; disorganized	Attempts organization Few, if any, transitions between ideas	Some lapses or flaws in organization May lack some transitions between ideas	Ideas loosely connected Transitions evident	Logical progression of ideas Moderately fluent Attempts compositional risks
	Details random, inappropriate, or barely apparent	Details lack elaboration, i.e. highlight paper	Repetitious details Several unelaborated details	Uneven development of details	Details appropriate and varied
Usage	No apparent control Severe/numerous errors	Numerous errors	Errors/patterns of errors may be evident	Some errors that do not interfere with meaning	Few errors
Sentence Construction	Assortment of incomplete and/or incorrect sentences	Excessive monotony/same structure Numerous errors	Little variety in syntax Some errors	Some variety Generally correct	Variety in syntax appropriate and effective
Mechanics	Errors so severe they detract from meaning	Numerous serious errors	Patterns of errors evident	No consistent pattern of errors Some errors that do not interfere with meaning	Few errors

Table D.1: New Jersey Registered Holistic Scoring Rubric Grade 3 - 5 (continued)

Content/Organization	Usage	Sentence Construction	Mechanics
Communicates intended message to intended audience Relates to topic Opening and closing Focused Logical progression of ideas Transitions Appropriate details and information	Tense formation Subject-verb agreement Pronouns usage/agreement Word choice/meaning Proper modifiers	Variety of type, structure and length Correct construction	Spelling Capitalization Punctuation

NON-SCORABLE RESPONSES	FR = Fragment	Student wrote too little to allow a reliable judgment of his/her writing.
	OT = Off Topic/ Off Task	Student did not write on the assigned topic/task.
	NE = Not English	Student wrote in a language other than English.
	NR = No Response	Blank

Note: All unscorable responses, (NSRs), with the exception of NR, must be coded by the Scoring Director.

Table D.2: New Jersey Registered Holistic Scoring Rubric Grades 6 - 8

In scoring, consider the grid of written language	Inadequate Command	Limited Command	Partial Command	Adequate Command	Strong Command	Superior Command
Score	1	2	3	4	5	6
Content and Organization	<ul style="list-style-type: none"> May lack opening and/or closing Minimal response to topic; uncertain focus No planning evident; disorganized Details random, inappropriate, or barely apparent 	<ul style="list-style-type: none"> May lack opening and/or closing Attempts to focus May drift or shift focus Attempts organization Few, if any, transitions between ideas Details lack elaboration, i.e., highlight paper 	<ul style="list-style-type: none"> May lack opening and/or closing Usually has single focus Some lapses or flaws in organization May lack some transitions between ideas Repetitious details Several unelaborated details 	<ul style="list-style-type: none"> Generally has opening and/or closing Single focus Sense of unity and coherence Key ideas developed Ideas loosely connected Moderately fluent Transitions evident 	<ul style="list-style-type: none"> Opening and closing Logical progression of ideas Moderately fluent Attempts compositional risks Uneven development of details Details appropriate and varied 	<ul style="list-style-type: none"> Opening and closing Logical progression of ideas Fluent, cohesive Compositional risks successful Details effective, vivid, explicit, and/or pertinent
	<ul style="list-style-type: none"> No apparent control Severe/numerous errors 	<ul style="list-style-type: none"> Numerous errors 	<ul style="list-style-type: none"> Errors/patterns of errors may be evident 	<ul style="list-style-type: none"> Some errors that do not interfere with meaning 	<ul style="list-style-type: none"> Few errors 	<ul style="list-style-type: none"> Very few, if any, errors
	<ul style="list-style-type: none"> Assortment of incomplete and/or incorrect sentences 	<ul style="list-style-type: none"> Excessive monotony/same structure Numerous errors 	<ul style="list-style-type: none"> Little variety in syntax Some errors 	<ul style="list-style-type: none"> Some variety Generally correct 	<ul style="list-style-type: none"> Variety in syntax appropriate and effective Few errors 	<ul style="list-style-type: none"> Precision and/or sophistication Very few, if any, errors
	<ul style="list-style-type: none"> Errors so severe they detract from meaning 	<ul style="list-style-type: none"> Numerous serious errors 	<ul style="list-style-type: none"> Patterns of errors evident 	<ul style="list-style-type: none"> No consistent pattern of errors Some errors that do not interfere with meaning 	<ul style="list-style-type: none"> Few errors 	<ul style="list-style-type: none"> Very few, if any, errors

Table D.2: New Jersey Registered Holistic Scoring Rubric Grade 6 - 8 (continued)

NON-SCORABLE RESPONSES		Content/Organization	Usage	Sentence Construction	Mechanics
FR =Fragment OT = Off Topic/ Off Task NE = Not English NR = No Response	Student wrote too little to allow a reliable judgment of his/her writing. Student did not write on the assigned topic/task. Student wrote in a language other than English. Blank	<ul style="list-style-type: none"> • Communicates intended message to intended audience • Relates to topic • Opening and closing • Focused • Logical progression of ideas • Transitions • Appropriate details and information 	<ul style="list-style-type: none"> • Tense formation • Subject-verb agreement • Pronoun usage/agreement • Word choice/meaning • Proper Modifiers 	<ul style="list-style-type: none"> • Variety of type, structure, and length • Correct construction 	<ul style="list-style-type: none"> • Spelling • Capitalization • Punctuation

Note: All unscorable responses (NSRs), with the exception of NR, must be coded by the Scoring Director.

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Table D.3: Open-Ended Scoring Rubric Reading

Points	Criteria
4	A 4-point response clearly demonstrates understanding of the task, completes all requirements, and provides an insightful explanation/opinion that links to or extends aspects of the text.
3	A 3-point response demonstrates an understanding of the task, completes all requirements, and provides some explanation/opinion using situations or ideas from the text as support.
2	A 2-point response may address all of the requirements, but demonstrates a partial understanding of the task, and uses text incorrectly or with limited success resulting in an inconsistent or flawed explanation.
1	A 1-point response demonstrates minimal understanding of the task, does not complete the requirements, and provides only a vague reference to or no use of the text.
0	A 0-point response is irrelevant or off-topic.

Table D.4: NJ ASK Generic Mathematics Rubric

3-Point Response	The response shows complete understanding of the problem's essential mathematical concepts. The student executes procedures completely and gives relevant responses to all parts of the task. The response contains few minor errors, if any. The response contains a clear, effective explanation detailing how the problem was solved so that the reader does not need to infer how and why decisions were made.
2-Point Response	The response shows nearly complete understanding of the problem's essential mathematical concepts. The student executes nearly all procedures and gives relevant responses to most parts of the task. The response may have minor errors. The explanation detailing how the problem was solved may not be clear, causing the reader to make some inferences.
1-Point Response	The response shows limited understanding of the problem's essential mathematical concepts. The response and procedures may be incomplete and/or may contain major errors. An incomplete explanation of how the problem was solved may contribute to questions as to how and why decisions were made.
0-Point Response	The response shows insufficient understanding of the problem's essential mathematical concepts. The procedures, if any, contain major errors. There may be no explanation of the solution or the reader may not be able to understand the explanation. The reader may not be able to understand how and why decisions were made.

The zero-to-three point generic scoring rubric below was created to help readers score open-ended responses consistently. In scoring, the reader should accept the use of appropriate diagrams, charts, formulas, and/or symbols which are part of a correct answer even when the question does not specifically request their use.

Table D.5: NJ ASK Generic Science Rubric

3-Point Response	Student response is reasonably complete, clear, and satisfactory.
2-Point Response	Student response has minor omissions and/or some incorrect or non-relevant information.
1-Point Response	Student response includes some correct information, but most information included in the response is either incorrect or not relevant.
0-Point Response	Student attempts the task but the response is incorrect, irrelevant, or inappropriate.

**APPENDIX E
STANDARD SETTING
PERFORMANCE LEVEL DESCRIPTORS**

Standard Setting

Demographic background information of PLD panelists and standard setting participants from the 2008 and 2009 meetings can be found in Appendix E1 of the 2009 NJ ASK Technical Report (PTM 1507-34),

New Jersey Assessment of Skills and Knowledge (NJ ASK)
Performance Level Descriptors
Language Arts Literacy
Grade 3

Partially Proficient

Reading. A student performing at the Partially Proficient level demonstrates **limited** ability to employ strategies needed to understand a variety of texts on a literal level. S/he **may** demonstrate **some** understanding of the central idea, supporting details, purpose, and organization of text, and **may** express **some** understanding of the text in written responses. A student at this level demonstrates **inconsistent** ability, however, to connect ideas, summarize relevant details, make inferences, and draw appropriate conclusions about the text in written responses.

Writing. A student performing at the Partially Proficient level **may** develop a single focus and **may attempt** to organize his/her writing using some supporting details that connect to the topic. S/he **inconsistently** follows the conventions of written language and demonstrates **limited** word choice and sentence structure in developing text. The student at this level **may not** sustain a purpose for writing and **may not** elaborate on ideas.

Proficient

Reading. A student performing at the Proficient level **demonstrates** the ability to employ strategies to comprehend a variety of texts literally and inferentially and to express understanding of the text in written responses. As a proficient reader, the student **recognizes** the central idea, supporting details, purpose, and organization of the text as well as some literary devices. The proficient student **can make connections** to the text, form opinions, and draw conclusions. The proficient reader **is able to synthesize** ideas from the reading and to use these to analyze and extend the meaning of the text in written responses.

Writing. A proficient writer uses a **repertoire of strategies** that enables him/her to accomplish the task of communicating a **clear and cohesive** message. The student **establishes and sustains** a purpose for writing and elaborates on information with specific details as s/he develops the text. The student connects ideas in a **logical progression**, provides support for opinions and conclusions, and generally uses transitions and the conventions of written language as well as varied sentence structures and word choice in his/her writing. S/he may take compositional risks.

Advanced Proficient

Reading. In addition to demonstrating the skills outlined for the proficient student, the Advanced Proficient reader **clearly and consistently** demonstrates the ability to synthesize, analyze, and extend the meaning of the text. In addition, the Advanced Proficient reader **interacts** with the text and makes meaningful connections in order to generate and extend ideas in written responses.

Writing. In addition to consistently demonstrating the skills outlined for the Proficient student, the Advanced Proficient writer **establishes and sustains** a single focus, organizes and connects ideas with **effective** transitions, and elaborates with **vivid** supporting details. The student at this level varies sentence structures, chooses **precise** words to convey meaning and message, and **consistently** uses the conventions of written language. S/he may take compositional risks.

New Jersey Assessment of Skills and Knowledge (NJ ASK)
Performance Level Descriptors
Language Arts Literacy
Grade 4

Partially Proficient

Reading. A student performing at the Partially Proficient level demonstrates **limited** ability to construct meaning from texts or to employ the strategies needed to analyze and critique a variety of texts. S/he **may** demonstrate **some** understanding of the central idea, supporting details, purpose, and organization of text, and **may** express **some** understanding of the text in written responses. A student at this level demonstrates **inconsistent** ability, however, to connect ideas, summarize relevant details, make inferences, draw appropriate conclusions, and express opinions about the text in written responses.

Writing. A student performing at the Partially Proficient level **may** develop a single focus and **may** attempt to organize his/her writing using some details that connect to the topic. S/he **inconsistently** follows the conventions of written language and demonstrates **limited** word choice and sentence structure in developing text. The student at this level **may not** sustain a purpose for writing and **may not** elaborate on ideas.

Proficient

Reading. A student performing at the Proficient level **constructs** meaning by employing a variety of strategies to synthesize, analyze, and critique text. As a proficient reader, the student **recognizes** the central idea, supporting details, purpose, and organization of the text. The proficient reader **demonstrates** the ability to comprehend a variety of texts literally and inferentially, make connections to the text, and understand the function of some literary devices. The student **is able to use relevant** details to support opinions and conclusions and to use these to analyze ideas and extend the meaning of the text in written responses.

Writing. A proficient writer uses a **repertoire of strategies** that enable him/her to accomplish the task of communicating a **clear and cohesive** message. The proficient writer **establishes and sustains** a single focus for the writing, generally organizes and connects ideas in a **logical progression**, and includes relevant supporting details that elaborate on ideas. The student demonstrates **some fluency** as a writer with his/her use of transitions, varied sentence structure, precise word choice, and the conventions of written language. The student may also attempt compositional risks.

Advanced Proficient

Reading. In addition to demonstrating the skills outlined for the Proficient student, the Advanced Proficient reader **clearly and consistently** demonstrates the ability to synthesize, analyze, and extend the meaning of the text. In addition, the Advanced Proficient reader **interacts** with the text and makes meaningful connections in order to generate and extend ideas in written responses.

Writing. In addition to **consistently** demonstrating the skills outlined for the Proficient student, the Advanced Proficient writer **establishes and sustains** a single focus, organizes and connects ideas with **effective** transitions, and elaborates with **vivid** supporting details. The student varies sentence structure, chooses **precise** words to convey meaning and message, and **consistently** uses the conventions of written language. S/he may take compositional risks.

New Jersey Assessment of Skills and Knowledge (NJ ASK)
Performance Level Descriptors
Language Arts Literacy
Grade 5

Partially Proficient

Reading. Students performing at the partially proficient level construct meaning by using reading strategies to comprehend on a literal level, make some connections to the text, and provide limited support for opinions and conclusions. They demonstrate limited understanding of text structures and literary elements, and attempt to use context clues to determine the meaning of unknown words.

Writing. As partially proficient writers, these students may develop a single focus and attempt to organize and connect ideas with relevant details. These students use limited word choice and sentence structure, and incorporate basic writing mechanics.

Proficient

Reading. Students performing at the proficient level construct meaning by using reading strategies to comprehend literally and inferentially. Proficient students synthesize details and analyze text. These students identify and explain literary elements, figurative language, and text structures. Proficient fifth grade students make connections, draw conclusions, and identify author's purpose, views, or beliefs. These students determine meaning of words and phrases by applying knowledge of word structure and using context clues.

Writing. As proficient writers, these students develop and maintain a single focus by organizing and connecting ideas with relevant details. Proficient students exhibit some variety in word choice and sentence structure, attempt writing techniques and use some transitions while incorporating basic writing mechanics.

Advanced Proficient

Reading. As readers, students performing at the advanced level of proficiency consistently demonstrate the skills outlined for proficient performance. In addition, the advanced proficient students extend meaning by making connections, generating new ideas, and making sound judgments about text.

Writing. As writers, students performing at the advanced level of proficiency consistently demonstrate the skills outlined for proficient performance. In addition, these students also use supporting details to convey and elaborate ideas. Advanced proficient students use fluid transitions, strong and appropriate word choice and sentence variety to purposefully engage the reader.

New Jersey Assessment of Skills and Knowledge (NJ ASK)
Performance Level Descriptors
Language Arts Literacy
Grade 6

Partially Proficient

Reading. Students performing at the partially proficient level construct meaning by using reading strategies for literal and limited inferential comprehension, make connections with the text and provide some support for opinions and conclusions. They demonstrate some understanding of text structures and literary elements, and use word structure and context clues to determine the meaning of unknown words.

Writing. As partially proficient writers, these students develop a single focus and organize and connect ideas with some supporting details. They write for a limited variety of purposes, attempt to provide support for opinions and conclusions, and incorporate basic writing mechanics.

Proficient

Reading. Students performing at the proficient level construct meaning by using reading strategies to comprehend literally and inferentially. Students at this level identify the central idea, relevant and essential details, and textual conventions. Proficient students are able to analyze and evaluate organizational structures and literary elements and devices. Proficient sixth grade students make connections and inferences, and identify author's purpose, views or beliefs. These students determine meaning of words and phrases by applying knowledge of word structure and using context clues.

Writing. As proficient writers, these students develop and maintain a single focus and supporting details within a clear and appropriate organizational structure. Proficient students write for a variety of purposes while keeping their audience in mind. Students provide support for opinions and conclusions, and attempt to use literary devices.

Advanced Proficient

Reading. As readers, students performing at the advanced level of proficiency consistently demonstrate the skills outlined for proficient performance. In addition, students demonstrate comprehension and extend meaning by making connections, generating new ideas, and making insightful judgments about text.

Writing. As writers, students performing at the advanced level of proficiency consistently demonstrate the skills outlined for proficient performance. In addition, the advanced proficient students develop a logical progression of ideas with style, voice, and precise word choice. Students at this level apply appropriate compositional risks.

New Jersey Assessment of Skills and Knowledge (NJ ASK)
Performance Level Descriptors
Language Arts Literacy
Grade 7

Partially Proficient

Reading. Seventh grade students performing at the partially proficient level construct meaning by using reading strategies for literal and inferential comprehension, and make connections with the text. They identify the central idea or theme, demonstrate some understanding of text structures and literary elements and provide limited support for opinions and conclusions. These students use word structure and context clues to determine the meaning of unknown words.

Writing. Seventh grade students partially proficient in writing develop a single focus and organize and connect ideas with some supporting details. They may establish a purpose for writing and provide limited support for opinions and conclusions. These students demonstrate some control of Standard English conventions.

Proficient

Reading. Seventh grade students performing at the proficient level demonstrate an understanding of a variety of texts. Proficient students identify the author's purpose, tone, and central idea or theme. They recognize the main idea and support it with evidence. Students use the organizational structure of text to construct meaning. They use word and sentence structure as well as context clues to determine the meaning of unknown words and phrases. Students interpret, extrapolate, and synthesize information.

Writing. Seventh grade students proficient in writing are able to develop a single focus and supply supporting details in a variety of organizational structures. Students at this level establish a purpose for writing and provide support for opinions and conclusions. Proficient students demonstrate control of Standard English conventions.

Advanced Proficient

Reading. In addition to demonstrating the skills outlined for proficient students, advanced proficient students infer themes or central ideas while analyzing and evaluating texts. Advanced students make connections to extend understanding and critically respond to a variety of texts.

Writing. As writers, students performing at the advanced level of proficiency consistently demonstrate the skills outlined for proficient performance. In addition, the advanced proficient students create a clear and unified composition by developing a central theme, supporting details and appropriate organizational structure. They demonstrate sophisticated use of literary elements as well as a precise vocabulary. Advanced students apply compositional risks.

New Jersey Assessment of Skills and Knowledge (NJ ASK)
Performance Level Descriptors
Language Arts Literacy
Grade 8

Partially Proficient

Reading. Eighth grade students performing at the partially proficient level construct meaning by using reading strategies for literal and inferential comprehension, and make connections with the text. They identify the central idea or theme, demonstrate some understanding of text structures and literary elements, and provide some support for opinions and conclusions. These students use word structure and context clues to determine the meaning of unknown words, and attempt to interpret, extrapolate, and synthesize information.

Writing. Eighth grade students partially proficient in writing develop a single focus and organize and connect ideas with supporting details. They establish a purpose for writing and provide limited support for opinions and conclusions. These students demonstrate some control of Standard English conventions

Proficient

Reading. Eighth grade students performing at the proficient level show an overall understanding of a variety of texts at literal and inferential levels. They make connections while interpreting and analyzing text. Proficient students recognize the author's purpose and respond critically to central themes, supporting details, and organizational structures of text. They interpret, extrapolate and synthesize information. Students support opinions and conclusions with evidence from the text.

Writing. Eighth grade students proficient in writing develop and sustain a single focus, include and elaborate supporting details, and use a variety of organizational structures. They establish a purpose for writing and elaborate on ideas. Students at this level provide support for opinions and conclusions while demonstrating control of Standard English conventions.

Advanced Proficient

Reading. In addition to demonstrating the skills outlined for proficient students, advanced proficient students show a sophisticated understanding of abstract themes and ideas. They make insightful connections while interacting with, interpreting, analyzing, and critiquing text. The advanced students synthesize, analyze, and evaluate written text.

Writing. As writers, students performing at the advanced level of proficiency consistently demonstrate the skills outlined for proficient performance. The advanced proficient students, in addition to developing a central theme, supporting details and organizational structure, demonstrate sophisticated use of literary elements and vivid vocabulary. Advanced students show a high degree of sustained control over textual conventions and apply compositional risks.

New Jersey Assessment of Skills and Knowledge (NJ ASK)
Performance Level Descriptors
Mathematics
Grade 3

Partially Proficient

Students performing at the Partially Proficient level have **limited** recall, recognition and application of basic facts and informational concepts.

- Partially Proficient students perform **simple routine** procedures such as computing a sum, difference or product, and can use a specified procedure with some accuracy. These students have **limited ability to demonstrate** number sense by using place value concepts and fractions. Partially proficient students **may have difficulty with determining the appropriate operation** for a given situation and with estimating their results.
- Partially Proficient students can **apply basic concepts** of geometry and measurement. These students have a **basic working knowledge** of spatial sense, geometric properties and geometric relationships. Partially proficient students can **sometimes use** appropriate measurement tools accurately.
- Partially Proficient students have a **basic understanding** of how quantities are related to one another and how algebra can be used to concisely represent and analyze those relationships. These students can recognize, describe, extend, and create **simple patterns** as well as solve **simple problems** involving functions.
- Partially Proficient students have a **basic understanding** of how to apply the concepts and methods of data analysis, probability, and discrete mathematics. These students are able to read a graph, table, or chart.
- Partially Proficient students can **identify and use basic mathematical terms** as well as apply some reasoning methods to solve simple problems.

New Jersey Assessment of Skills and Knowledge (NJ ASK)
Performance Level Descriptors
Mathematics
Grade 3 (continued)

Proficient

Students performing at the proficient level demonstrate recall, recognition and application of facts and informational concepts.

- Proficient students **perform routine procedures** such as computing a sum, difference or product, and can use a specified procedure with accuracy. These students are able to demonstrate number sense by using place value concepts and fractions. Proficient students **determine the appropriate operation** for a given situation and can use estimation appropriately.
- Proficient students **understand and apply concepts** of geometry and measurement. These students can **demonstrate a working knowledge** of spatial sense, geometric properties and geometric relationships. Proficient students can use appropriate measurement tools accurately.
- Proficient students **demonstrate an understanding** of how quantities are related to one another and how algebra can be used to concisely represent and analyze those relationships. These students can recognize, describe, extend, and create patterns as well as solve problems involving functions.
- Proficient students **understand and apply** the concepts and methods of data analysis, probability, and discrete mathematics. These students are able to read, interpret, and represent information in a graph, table, or chart.
- Proficient students **use various forms** of representation to illustrate steps to a solution and **effectively communicate** a variety of reasoning methods to solve multi-step problems. Proficient students can explain steps and procedures for finding solutions, as well as check the reasonableness of their results.

Advanced Proficient

Students performing at the Advanced Proficient level demonstrate the qualities outlined for Proficient performance. In addition, these students determine strategies and procedures to solve **routine and non-routine** problems. An Advanced Proficient student draws appropriate inferences and provides explanations that are **consistently clear and thorough**. These students **consistently** demonstrate the ability to abstract relevant information, use **multiple strategies** and/or reasoning methods, and use various forms of representations to solve challenging problems. These students demonstrate an understanding of the reasonableness of their answers.

New Jersey Assessment of Skills and Knowledge (NJ ASK)
Performance Level Descriptors
Mathematics
Grade 4

Partially Proficient

Students performing at the Partially Proficient level have **limited** recall, recognition and application of basic mathematical concepts, skills, and vocabulary to solve problems involving real world situations.

- Partially Proficient students understand and perform **simple routine** numerical operations of whole numbers. The students have **limited ability to demonstrate** number sense by using place value concepts, fractions and decimals. Partially Proficient students can compute **simple** sums and differences of fractions and decimals. These students have difficulty with determining the appropriate operation for a given situation and with estimating their results.
- Partially proficient students **understand and apply basic concepts** of geometry and measurement. These students demonstrate a **basic working knowledge** of spatial sense, geometric properties, and geometric relationships. Partially Proficient students **can use** appropriate measurement tools accurately to solve simple problems involving perimeter, area, and volume. These students have a **basic understanding** of coordinate geometry and lines of symmetry.
- Partially Proficient students have a **basic understanding** of how quantities are related to one another and how to represent and analyze those relationships using algebraic concepts. These students can recognize, describe, extend, and create **simple patterns**, as well as solve **simple problems** involving functions.
- Partially Proficient students have a **basic understanding** of the concepts and methods of data analysis, probability, and discrete mathematics. These students can read, interpret and construct simple graphs, tables, and/or charts, but often find it difficult to predict or make an informed decision based on information retrieved from a variety of sources. Partially Proficient students demonstrate limited skills using tools and strategies for representing, organizing, and interpreting data. These students can solve simple problems involving mean, median, and mode.
- Partially Proficient students can **identify and use basic mathematical terms** and apply some reasoning methods to solve simple problems.

New Jersey Assessment of Skills and Knowledge (NJ ASK)

Performance Level Descriptors

Mathematics

Grade 4 (continued)

Proficient

Students performing at the proficient level demonstrate recall, recognition and application of mathematical concepts, skills, and vocabulary to solve problems involving real world situations.

- Proficient students **understand and perform** numerical operations of whole numbers and can use a specified procedure with **accuracy**. These students demonstrate number sense by using place value concepts, fractions, and decimals. Proficient students can compute sums and differences of fractions and decimals. These students **determine the appropriate operation** for a given situation and can use estimation appropriately.
- Proficient students **understand and apply concepts** of geometry and measurement. These students **demonstrate a working knowledge** of spatial sense, geometric properties and geometric relationships. Proficient students can use appropriate measurement tools accurately to solve problems involving perimeter, area and volume. These students understand and apply concepts of coordinate geometry as well as identify lines of symmetry.
- Proficient students **demonstrate an understanding** how quantities are related to one another and how to represent and analyze those relationships using algebraic concepts. These students can recognize, describe, extend, and create patterns as well as solve functions for a given variable, including inverse relationships. Proficient students can understand, name, and apply properties of operations and numbers.
- Proficient students have an **understanding of how to apply** the concepts and techniques of data analysis, probability, and discrete mathematics. These students can read, interpret and construct graphs, tables and/or charts as well as predict or make an informed decision based on information retrieved from a variety of sources. Proficient students demonstrate skills using tools and strategies for representing, organizing, and interpreting data as well as solve problems involving mean, median, and mode.
- Proficient students **use various forms** of representation to illustrate steps to a solution and **effectively communicate** a variety of reasoning methods to solve multi-step problems. These students can explain steps and procedures for finding solutions as well as check the reasonableness of their results.

Advanced Proficient

Students performing at the Advanced Proficient level **clearly and consistently demonstrate** the qualities outlined for Proficient performance. These students **clearly and consistently demonstrate** thorough conceptual understanding of procedural and analytical skills. In addition, Advanced Proficient students demonstrate the use of **abstract thinking** and provide explanations that are **consistently clear and thorough**. These students use both inductive and deductive reasoning to solve non-routine problems as well as consistently demonstrate the ability to abstract relevant information, use multiple strategies and/or reasoning methods, and use various forms of representations to solve complex problems. Advanced Proficient students demonstrate an understanding of the reasonableness of their answers.

New Jersey Assessment of Skills and Knowledge (NJ ASK)
Performance Level Descriptors
Mathematics
Grade 5

Partially Proficient

Students performing at the partially proficient level have limited recognition and understanding of and inconsistently apply basic mathematical concepts, skills, and vocabulary to theoretical and real world situations.

- These students may understand that a quantity can be represented numerically in various ways. Partially proficient students perform basic computational procedures with inconsistent accuracy.
- Partially proficient students struggle to apply geometric properties and comprehend spatial relationships.
- Partially proficient students have difficulty using informal algebraic concepts and processes.
- Partially proficient students inconsistently read, construct, and interpret data and graphs. They inconsistently apply the concepts and methods of discrete mathematics.

These students will occasionally infer, reason, and estimate while problem solving. Partially proficient students are frequently ineffectual in selecting a successful process or strategy. These students have difficulty demonstrating a basic understanding of mathematical concepts through written expression and/or symbolic representation.

Proficient

Students performing at the proficient level recognize and understand basic mathematical concepts, skills, and vocabulary and apply them to theoretical and real world situations.

- Proficient students understand that a quantity can be represented numerically in various ways. These students perform basic computational procedures.
- Proficient students apply geometric properties and spatial relationships.
- Proficient students use informal algebraic concepts and processes.
- Proficient students read, construct, and interpret data and graphs. They apply the concepts and methods of discrete mathematics.

These students infer, reason, and estimate while problem solving. Proficient students are flexible in selecting a successful process or strategy. These students demonstrate a basic understanding of mathematical concepts through written expression and/or symbolic representation.

Advanced Proficient

Students performing at the advanced proficient level consistently demonstrate the qualities outlined for proficient performance. In addition, advanced proficient students analyze methods for appropriateness, synthesize processes, and evaluate mathematical relationships. Advanced proficient students demonstrate conceptual understanding by consistently providing clear and complete explanations. These students demonstrate the ability to transfer mathematical concepts to other applications and successfully form conjectures.

New Jersey Assessment of Skills and Knowledge (NJ ASK)
Performance Level Descriptors
Mathematics
Grade 6

Partially Proficient

Sixth grade students performing at the partially proficient level in mathematics demonstrate limited evidence of and/or an inability to communicate conceptual understanding of procedural and analytical skills. Partially proficient students inconsistently apply mathematical skills and knowledge to theoretical and real world situations. These students struggle to integrate skills across the four mathematical content standards.

- Partially proficient students may demonstrate some understanding of but inconsistently apply appropriate standard numerical operations. These students may determine the reasonableness of an answer.
- Partially proficient students have difficulty understanding and applying geometric concepts including properties, measurement, and special relationships.
- Partially proficient students may inconsistently use simple algebraic concepts and processes.
- They inconsistently read, construct, and interpret data and graphs, determine probabilities of events, and may misapply the concepts and methods of discrete mathematics.

Proficient

Sixth grade students performing at the proficient level in mathematics demonstrate evidence of and communicate conceptual understanding of procedural and analytical skills. Proficient students apply mathematical skills and knowledge to theoretical and real world situations. In addition, these students integrate skills across the four mathematical content standards.

- Proficient students understand and apply appropriate standard numerical operations: an understanding for problem solving in practical situations. These students can determine the reasonableness of an answer.
- Proficient students understand and apply geometric concepts including properties, measurement, and special relationships.
- Proficient students use simple algebraic concepts and processes.
- Proficient students read, construct, and interpret data and graphs, determine probabilities of events, and apply the concepts and methods of discrete mathematics.

Advanced Proficient

Sixth grade students performing at the advanced proficient level in mathematics consistently demonstrate the qualities for proficient performance. In addition, these students demonstrate the use of abstract thinking and mathematical fluency to provide explanations that are consistently clear and thorough. Advanced proficient students support logical, efficient methods in solving problems. These students consistently make accurate inferences and predictions. Advanced proficient students may support responses with appropriate mathematical explanation. These students successfully analyze and draw appropriate inferences from data. They demonstrate the ability to transfer mathematical concepts to other applications and successfully form conjectures.

New Jersey Assessment of Skills and Knowledge (NJ ASK)
Performance Level Descriptors
Mathematics
Grade 7

Partially Proficient

Seventh grade students performing at the partially proficient level demonstrate limited evidence of conceptual understanding of mathematical knowledge, procedures, skills, and processes across the four content standards. A partially proficient student inconsistently demonstrates the ability to:

- identify, recognize and compare different representations of numbers. They demonstrate a limited understanding of the meanings and uses of numerical operations.
- identify, describe, and classify two- and three-dimensional shapes, apply geometric properties, and solve problems involving geometry, spatial sense, and measurement.
- recognize, evaluate and identify algebraic representations and simple patterns of theoretical and real-world problems, including the extension of simple patterns.
- model situations, solve problems, and analyze, and draw appropriate inferences from data. They have difficulty understanding and interpreting the fundamental concepts of probability, and inconsistently apply concepts of discrete mathematics to solve problems.

Partially proficient students comprehend some mathematical vocabulary and communicate their reasoning ineffectually.

Proficient

Seventh grade students performing at the proficient level demonstrate evidence of conceptual understanding of mathematical knowledge, procedures, skills, and processes across the four content standards.

- Proficient students identify, recognize and compare different representations of numbers and demonstrate an understanding of the meanings and uses of numerical operations.
- Proficient students identify, describe, and classify two- and three-dimensional shapes, apply geometric properties, and solve problems involving geometry, spatial sense, and measurement.
- Proficient students recognize, evaluate and identify algebraic representations and simple patterns of theoretical and real-world problems, including the extension of simple patterns.
- Proficient students model situations, solve problems, and analyze, and draw appropriate inferences from data. They understand and interpret the fundamental concepts of probability and apply concepts of discrete mathematics to solve problems.

Proficient students are mathematically literate in their ability to comprehend vocabulary, understand appropriate context and communicate their reasoning.

Advanced Proficient

Advanced proficient students demonstrate the qualities outlined for proficient performance. Additionally, they use abstract reasoning and demonstrate mathematical fluency through problem solving and assess the reasonableness of their solution. Advanced proficient students extrapolate information and form and support conclusions through clear and thorough explanations.

New Jersey Assessment of Skills and Knowledge (NJ ASK)
Performance Level Descriptors
Mathematics
Grade 8

Partially Proficient

Eighth grade students performing at the partially proficient level demonstrate limited evidence of conceptual and analytical understanding of mathematical knowledge, procedures, skills and processes across and within the four content standards. A partially proficient student inconsistently demonstrates the ability to:

- identify, recognize and compare different representations of numbers. They demonstrate a limited understanding of the meanings and uses of numerical operations and number systems.
- apply geometrical concepts; identify, describe, and classify two- and three-dimensional shapes; and solve problems involving geometry, spatial sense and measurement.
- represent and analyze relationships among variable quantities and solve problems involving patterns, functions, and algebraic concepts and processes. Students have difficulty modeling situations algebraically, symbolically and graphically.
- analyze, interpret, and make predictions based on appropriate representations for sets of data. They are limited in applying and interpreting the concepts of probability and discrete mathematics to solve problems.

Partially proficient students comprehend some mathematical vocabulary and communicate their reasoning ineffectually within and among the mathematical content areas.

Proficient

Eighth grade students performing at the proficient level demonstrate evidence of conceptual and analytical understanding of mathematical knowledge, procedures, skills and processes across and within the four content standards.

- Proficient students identify, recognize and compare different representations of numbers and demonstrate an understanding of the meanings and uses of numerical operations and number systems.
- Proficient students apply geometrical concepts; identify, describe, and classify two- and three-dimensional shapes; and solve problems involving geometry, spatial sense and measurement.
- Proficient students will represent and analyze relationships among variable quantities and solve problems involving patterns, functions, and algebraic concepts and processes. Students will model situations algebraically, symbolically and graphically.
- Proficient students analyze, interpret, and make predictions based on appropriate representations for sets of data. They apply and interpret the concepts of probability and discrete mathematics to solve problems.

Proficient students are mathematically literate in their ability to comprehend vocabulary, understand appropriate context and communicate their reasoning within and among the mathematical content areas.

New Jersey Assessment of Skills and Knowledge (NJ ASK)
Performance Level Descriptors
Mathematics
Grade 8 (continued)

Advanced Proficient

Advanced proficient students demonstrate the qualities outlined for the proficient student. Additionally, advanced proficient students use inductive and deductive reasoning as well as demonstrate mathematical fluency. Students performing at the advanced proficient level demonstrate clear and thorough conceptual understanding. They are able to extrapolate information to form and support conclusions through clear and thorough explanations as well as assess the reasonableness of their solution.

**New Jersey Assessment of Skills and Knowledge (NJ ASK)
and Grade Eight Proficiency Assessment (GEPA)**
Performance Level Descriptors
Science
Grade 8

Proficient

The Proficient student can recognize the structural levels of living things. This student knows that some traits of organisms are beneficial and some detrimental. This student can interpret visual and textual data to understand the relationship within a food web and the interdependence of living and nonliving systems.

The proficient student can recognize the effect force has on an object, trace the flow of energy through a system, and use the properties of matter to identify and separate materials. This student can understand different types of energy and use information from data charts to interpret relationships and predict outcomes.

The proficient student can recognize the existence of a relationship between the moon and tides, recognize the different characteristics of the planets in the solar system, and understand the natural forces that change the surface of the Earth, including chemical and physical weathering.

Advanced Proficient

The advanced proficient student can support scientific conclusions with valid contextual and visual data and make predictions based on the interactions of living things. This student is able to use interpretive skills to analyze visual and textual data in order to solve problems dealing with the application of force and energy.

The advanced proficient student understands the difference between types of energy waves and can recognize and apply experimental principles and empirical data.

The advanced proficient student can recognize the nature of the tides' relationship to Earth, Sun, and moon; interpret topographical maps; and identify the steps in the process of weathering and erosion.

APPENDIX F
SCALE SCORE CUMULATIVE
FREQUENCY DISTRIBUTIONS

Table F.1: LAL Grade 3

Language Arts Literacy Grade 3								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
1	100	7	0.01	0.01	0.01	0.01	0.02	0.00
2	100	27	0.03	0.01	0.04	0.06	0.04	0.02
3	109	58	0.06	0.03	0.09	0.15	0.08	0.03
4	117	119	0.12	0.07	0.17	0.29	0.20	0.05
5	123	218	0.22	0.12	0.31	0.52	0.37	0.08
6	129	348	0.35	0.18	0.50	0.90	0.57	0.12
7	133	529	0.53	0.29	0.75	1.31	0.89	0.18
8	138	774	0.77	0.47	1.05	1.84	1.33	0.29
9	142	1098	1.09	0.65	1.51	2.66	1.82	0.41
10	146	1522	1.52	0.95	2.05	3.56	2.53	0.61
11	150	2118	2.11	1.39	2.79	4.92	3.44	0.90
12	154	2845	2.83	1.95	3.67	6.50	4.65	1.23
13	158	3810	3.80	2.66	4.86	8.55	6.25	1.68
14	161	5006	4.99	3.60	6.30	11.07	8.10	2.31
15	165	6453	6.43	4.74	8.03	13.90	10.38	3.11
16	169	8295	8.26	6.34	10.08	17.45	13.32	4.10
17	172	10535	10.49	8.23	12.64	21.41	16.84	5.44
18	175	13165	13.11	10.47	15.62	25.62	20.95	7.13
19	179	16165	16.10	13.00	19.04	30.24	25.19	9.29
20	182	19617	19.54	16.05	22.85	35.18	30.14	11.82
21	185	23432	23.34	19.36	27.12	40.20	35.50	14.82
22	189	27718	27.61	23.17	31.83	45.84	40.92	18.45
23	192	32272	32.15	27.38	36.67	51.12	46.50	22.59
24	195	37180	37.04	31.99	41.83	56.34	52.39	27.24
25	200	42459	42.30	37.06	47.26	61.58	58.26	32.42
26	202	47935	47.75	42.22	53.00	66.96	63.95	37.93
27	206	53662	53.46	47.75	58.87	71.89	69.55	44.06
28	209	59420	59.19	53.37	64.71	76.64	74.57	50.38
29	213	65220	64.97	59.23	70.42	80.90	79.54	56.94
30	217	70958	70.69	65.23	75.87	85.07	83.85	63.63
31	221	76330	76.04	71.04	80.79	88.39	87.68	70.04
32	226	81485	81.17	76.76	85.37	91.35	91.21	76.25
33	230	85905	85.58	81.75	89.22	93.73	93.72	81.76
34	235	89956	89.61	86.43	92.64	95.76	95.75	86.91
35	241	93191	92.83	90.28	95.27	97.21	97.32	90.99
36	250	95673	95.31	93.49	97.03	98.35	98.49	94.13
37	253	97458	97.08	95.84	98.27	99.11	99.17	96.38
38	260	98635	98.26	97.46	99.02	99.53	99.52	97.88
39	268	99423	99.04	98.59	99.47	99.77	99.76	98.83
40	276	99874	99.49	99.24	99.73	99.86	99.90	99.38

Language Arts Literacy Grade 3								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
41	284	100120	99.74	99.59	99.88	99.92	99.97	99.69
42	293	100271	99.89	99.83	99.94	99.98	99.98	99.87
43	300	100331	99.95	99.92	99.97	99.98	100.00	99.94
44	300	100366	99.98	99.97	99.99	99.99	100.00	99.98
45	300	100380	100.00	99.99	100.00	100.00	100.00	100.00
46	300	100385	100.00	100.00	100.00	100.00	100.00	100.00

* Alternate and Braille forms excluded

Table F.2: LAL Grade 4

Language Arts Literacy Grade 4								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
1	100	2	0.00	0.00	0.00	0.00	0.00	0.00
2	100	15	0.01	0.00	0.02	0.04	0.02	0.01
3	100	32	0.03	0.01	0.05	0.07	0.04	0.02
4	100	57	0.06	0.03	0.08	0.12	0.08	0.03
5	100	112	0.11	0.05	0.16	0.23	0.19	0.05
6	103	186	0.18	0.10	0.26	0.42	0.32	0.07
7	108	297	0.29	0.16	0.42	0.73	0.46	0.12
8	113	438	0.43	0.26	0.58	1.12	0.67	0.16
9	118	626	0.61	0.38	0.83	1.55	0.99	0.23
10	122	858	0.84	0.53	1.14	2.13	1.34	0.32
11	127	1172	1.15	0.71	1.56	2.92	1.79	0.45
12	131	1546	1.52	0.95	2.05	3.84	2.29	0.63
13	135	1983	1.95	1.23	2.62	4.81	3.10	0.77
14	139	2561	2.52	1.63	3.35	6.16	3.98	1.03
15	142	3212	3.15	2.06	4.19	7.60	5.03	1.33
16	146	4004	3.93	2.65	5.13	9.27	6.35	1.68
17	149	4881	4.79	3.29	6.20	11.11	7.71	2.12
18	153	5935	5.83	4.19	7.36	13.25	9.53	2.61
19	156	7127	7.00	5.15	8.73	15.84	11.38	3.17
20	159	8477	8.33	6.26	10.26	18.49	13.56	3.87
21	163	10025	9.85	7.57	11.98	21.34	16.10	4.73
22	166	11759	11.55	8.99	13.94	24.40	18.91	5.71
23	169	13644	13.40	10.63	15.99	27.75	21.64	6.90
24	172	15722	15.44	12.54	18.15	31.11	24.87	8.25
25	175	18146	17.82	14.65	20.78	35.01	28.44	9.89
26	178	20715	20.35	16.97	23.50	39.07	32.02	11.73
27	182	23587	23.17	19.70	26.41	43.32	36.12	13.79

Language Arts Literacy Grade 4								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
28	185	26797	26.32	22.69	29.72	47.61	40.25	16.45
29	188	30191	29.65	25.87	33.20	51.78	44.50	19.35
30	191	33820	33.22	29.31	36.88	55.93	49.06	22.54
31	194	37943	37.27	33.19	41.09	60.39	54.03	26.35
32	200	42307	41.55	37.48	45.37	64.79	58.86	30.58
33	201	46895	46.06	41.93	49.93	69.16	63.73	35.21
34	205	51771	50.85	46.69	54.76	73.25	68.53	40.34
35	208	56893	55.88	51.63	59.87	77.18	73.36	45.93
36	212	62237	61.13	56.96	65.04	81.06	77.91	51.94
37	216	67686	66.48	62.46	70.26	84.82	82.38	58.09
38	220	72841	71.54	67.67	75.19	87.89	86.29	64.12
39	224	77979	76.59	73.03	79.94	90.90	89.63	70.28
40	229	82847	81.37	78.11	84.44	93.19	92.53	76.22
41	234	87310	85.75	82.95	88.40	95.24	94.62	81.86
42	239	91274	89.65	87.36	91.80	96.80	96.48	86.86
43	245	94452	92.77	90.94	94.49	97.98	97.82	90.85
44	250	96910	95.18	93.81	96.48	98.83	98.72	93.94
45	257	98821	97.06	96.11	97.96	99.37	99.31	96.36
46	265	100045	98.26	97.66	98.83	99.65	99.67	97.89
47	273	100860	99.06	98.71	99.40	99.83	99.83	98.89
48	282	101347	99.54	99.35	99.72	99.93	99.93	99.46
49	293	101590	99.78	99.67	99.88	99.96	99.96	99.75
50	300	101725	99.91	99.85	99.97	99.98	99.99	99.90
51	300	101785	99.97	99.95	99.99	99.99	100.00	99.98
52	300	101810	100.00	99.99	100.00	100.00	100.00	100.00
53	300	101814	100.00	100.00	100.00	100.00	100.00	100.00

* Alternate and Braille forms excluded

Table F.3: LAL Grade 5

Language Arts Literacy Grade 5								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
1	100	2	0.00	0.00	0.00	0.00	0.01	0.00
2	100	8	0.01	0.01	0.01	0.01	0.02	0.00
3	100	15	0.01	0.01	0.02	0.02	0.02	0.01
4	100	30	0.03	0.02	0.04	0.05	0.04	0.02
5	106	60	0.06	0.04	0.08	0.12	0.08	0.03
6	111	94	0.09	0.06	0.12	0.18	0.13	0.05
7	116	146	0.14	0.09	0.19	0.31	0.22	0.07

Language Arts Literacy Grade 5								
		All Students*	Female	Male	Afr. A.	Hispanic	White	
		Cumulative	Cumul.	Cumul.	Cumul.	Cumul.	Cumul.	
Raw Score	Scale Score	#	%	%	%	%	%	
8	121	230	0.22	0.14	0.30	0.49	0.38	0.10
9	125	328	0.32	0.21	0.42	0.71	0.52	0.15
10	129	502	0.49	0.31	0.66	1.08	0.78	0.24
11	133	711	0.70	0.42	0.95	1.54	1.10	0.34
12	137	991	0.97	0.60	1.31	2.20	1.56	0.45
13	140	1383	1.35	0.83	1.84	3.06	2.21	0.61
14	144	1839	1.80	1.12	2.44	4.15	2.86	0.83
15	147	2425	2.37	1.55	3.15	5.42	3.88	1.05
16	150	3145	3.07	2.03	4.07	6.87	5.15	1.40
17	153	4015	3.92	2.70	5.08	8.69	6.64	1.79
18	156	5091	4.98	3.50	6.37	11.04	8.42	2.24
19	159	6326	6.18	4.48	7.80	13.62	10.41	2.85
20	162	7856	7.68	5.79	9.47	16.49	12.93	3.67
21	165	9553	9.34	7.17	11.39	19.86	15.64	4.56
22	168	11375	11.12	8.71	13.40	23.39	18.49	5.56
23	171	13542	13.24	10.52	15.81	27.11	21.76	6.92
24	174	15832	15.48	12.54	18.26	30.97	25.37	8.29
25	176	18348	17.94	14.82	20.89	35.11	29.01	9.94
26	179	21026	20.55	17.23	23.70	39.25	33.14	11.68
27	182	23792	23.26	19.78	26.55	43.11	37.08	13.74
28	184	26788	26.19	22.60	29.58	47.18	41.26	16.07
29	187	29909	29.24	25.61	32.68	51.00	45.43	18.62
30	190	33235	32.49	28.79	36.00	55.26	49.47	21.45
31	193	36517	35.70	31.93	39.27	58.89	53.54	24.36
32	195	39960	39.06	35.26	42.67	62.62	57.37	27.58
33	200	43637	42.66	38.77	46.34	66.50	61.33	31.15
34	201	47431	46.36	42.48	50.04	70.08	65.28	34.94
35	204	51363	50.21	46.26	53.95	73.77	69.23	38.94
36	207	55434	54.19	50.25	57.92	77.05	73.26	43.26
37	210	59421	58.08	54.09	61.88	80.00	76.85	47.67
38	213	63425	62.00	58.03	65.76	82.76	80.15	52.22
39	216	67742	66.22	62.33	69.90	85.43	83.53	57.20
40	219	71870	70.25	66.57	73.74	87.97	86.49	62.04
41	223	76022	74.31	70.86	77.58	90.08	89.03	67.18
42	226	80035	78.23	74.87	81.42	92.14	91.14	72.23
43	230	83948	82.06	78.97	84.99	93.99	93.17	77.10
44	234	87487	85.52	82.70	88.20	95.64	94.86	81.57
45	238	90768	88.73	86.20	91.12	96.86	96.40	85.76
46	242	93637	91.53	89.39	93.56	97.84	97.52	89.41
47	246	96036	93.87	92.20	95.46	98.57	98.28	92.42
48	250	97951	95.75	94.48	96.95	99.11	98.91	94.79

Language Arts Literacy Grade 5								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
49	256	99429	97.19	96.25	98.09	99.46	99.34	96.61
50	261	100471	98.21	97.53	98.86	99.72	99.60	97.89
51	267	101228	98.95	98.55	99.33	99.82	99.82	98.83
52	273	101691	99.40	99.17	99.63	99.89	99.89	99.37
53	280	101991	99.70	99.56	99.82	99.96	99.95	99.68
54	287	102159	99.86	99.79	99.93	99.99	99.98	99.86
55	294	102238	99.94	99.90	99.97	99.99	99.99	99.95
56	300	102270	99.97	99.95	99.98	99.99	100.00	99.97
57	300	102288	99.99	99.98	100.00	100.00	100.00	99.99
58	300	102302	100.00	100.00	100.00	100.00	100.00	100.00

* Alternate and Braille forms excluded

Table F.4: LAL Grade 6

Language Arts Literacy Grade 6								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
1	100	2	0.00	0.00	0.00	0.00	0.00	0.00
2	100	4	0.00	0.00	0.00	0.01	0.01	0.00
4	108	7	0.01	0.01	0.01	0.01	0.01	0.01
5	113	16	0.02	0.01	0.02	0.04	0.01	0.01
6	118	41	0.04	0.01	0.07	0.12	0.03	0.02
7	122	69	0.07	0.03	0.10	0.17	0.06	0.04
8	126	108	0.11	0.04	0.17	0.27	0.11	0.06
9	129	182	0.18	0.08	0.27	0.44	0.21	0.09
10	132	272	0.27	0.13	0.40	0.66	0.32	0.14
11	135	397	0.39	0.21	0.56	0.93	0.51	0.19
12	138	560	0.55	0.30	0.78	1.28	0.73	0.27
13	141	800	0.78	0.41	1.13	1.83	1.06	0.39
14	143	1062	1.04	0.55	1.50	2.44	1.43	0.51
15	146	1362	1.33	0.70	1.92	3.15	1.90	0.63
16	148	1737	1.70	0.95	2.40	4.01	2.52	0.77
17	151	2154	2.10	1.21	2.95	5.02	3.08	0.97
18	153	2631	2.57	1.48	3.60	6.06	3.79	1.21
19	156	3179	3.10	1.84	4.30	7.25	4.67	1.45
20	158	3795	3.70	2.26	5.08	8.67	5.52	1.75
21	161	4545	4.44	2.74	6.04	10.24	6.72	2.11
22	163	5297	5.17	3.25	6.99	11.84	7.88	2.48
23	165	6149	6.00	3.91	7.99	13.65	9.15	2.93
24	168	7026	6.86	4.58	9.02	15.30	10.55	3.41

Language Arts Literacy Grade 6								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
25	170	8068	7.88	5.39	10.23	17.44	12.23	3.95
26	172	9190	8.97	6.25	11.56	19.56	14.01	4.55
27	174	10413	10.17	7.24	12.95	21.90	15.81	5.28
28	176	11797	11.52	8.35	14.53	24.40	17.81	6.15
29	179	13254	12.94	9.56	16.16	26.83	19.92	7.10
30	181	14841	14.49	10.90	17.91	29.43	22.31	8.15
31	183	16573	16.18	12.37	19.80	32.32	24.92	9.26
32	185	18435	18.00	14.02	21.79	35.11	27.61	10.60
33	187	20558	20.07	15.92	24.02	38.38	30.62	12.12
34	190	22831	22.29	17.96	26.41	41.37	33.82	13.90
35	192	25357	24.75	20.30	28.99	44.98	37.17	15.86
36	194	28004	27.34	22.69	31.76	48.37	40.69	18.00
37	196	30795	30.06	25.25	34.64	51.96	44.02	20.39
38	198	33804	33.00	28.07	37.69	55.49	47.74	23.03
39	200	37131	36.25	31.21	41.05	59.24	51.77	26.03
40	203	40595	39.63	34.40	44.61	62.80	55.76	29.27
41	205	44280	43.23	37.96	48.25	66.33	59.82	32.89
42	208	48136	46.99	41.66	52.07	70.04	63.66	36.80
43	210	52130	50.89	45.48	56.04	73.51	67.50	41.04
44	213	56359	55.02	49.62	60.17	77.08	71.54	45.50
45	215	60614	59.17	53.88	64.21	80.11	75.42	50.14
46	218	65114	63.56	58.42	68.47	83.36	79.37	55.13
47	221	69631	67.97	62.99	72.73	86.13	82.91	60.32
48	224	73907	72.15	67.46	76.62	88.73	86.13	65.32
49	227	78228	76.37	71.99	80.55	91.09	89.01	70.54
50	230	82209	80.25	76.34	83.99	93.08	91.52	75.40
51	233	85925	83.88	80.40	87.20	94.75	93.63	79.99
52	237	89378	87.25	84.23	90.14	96.08	95.23	84.36
53	241	92408	90.21	87.68	92.62	97.34	96.60	88.08
54	244	94929	92.67	90.57	94.67	98.14	97.72	91.16
55	250	96989	94.68	93.06	96.23	98.76	98.59	93.72
56	253	98614	96.27	95.05	97.43	99.22	99.08	95.72
57	257	99813	97.44	96.50	98.34	99.55	99.39	97.09
58	261	100679	98.28	97.63	98.91	99.71	99.67	98.09
59	266	101295	98.89	98.46	99.29	99.82	99.80	98.78
60	271	101727	99.31	99.04	99.57	99.92	99.89	99.26
61	275	102007	99.58	99.42	99.73	99.95	99.94	99.56
62	281	102202	99.77	99.68	99.85	99.99	99.98	99.77
63	286	102319	99.88	99.84	99.93	99.99	99.99	99.89
64	293	102386	99.95	99.92	99.98	100.00	100.00	99.95
65	300	102419	99.98	99.97	99.99	100.00	100.00	99.99

Language Arts Literacy Grade 6								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
66	300	102427	99.99	99.99	99.99	100.00	100.00	100.00
67	300	102431	99.99	99.99	99.99	100.00	100.00	100.00
68	300	102437	100.00	100.00	100.00	100.00	100.00	100.00

* Alternate, Braille, Spanish, and Special Equating not included

Table F.5: LAL Grade 7

Language Arts Literacy Grade 7								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
1	100	1	0.00	0.00	0.00	0.01	0.00	0.00
2	100	3	0.00	0.00	0.00	0.01	0.00	0.00
3	100	5	0.00	0.00	0.01	0.01	0.00	0.00
4	100	11	0.01	0.01	0.01	0.04	0.01	0.00
5	100	28	0.03	0.02	0.04	0.08	0.04	0.01
6	100	49	0.05	0.03	0.07	0.12	0.08	0.02
7	100	70	0.07	0.03	0.10	0.16	0.13	0.02
8	103	114	0.11	0.06	0.15	0.28	0.18	0.04
9	108	185	0.18	0.09	0.26	0.49	0.29	0.05
10	112	271	0.26	0.13	0.38	0.69	0.43	0.08
11	117	408	0.39	0.20	0.57	1.09	0.62	0.13
12	120	570	0.55	0.30	0.78	1.45	0.86	0.19
13	124	796	0.77	0.43	1.08	1.99	1.23	0.27
14	128	1075	1.04	0.57	1.47	2.71	1.59	0.38
15	131	1370	1.33	0.71	1.89	3.41	2.07	0.51
16	134	1742	1.69	0.93	2.39	4.27	2.68	0.65
17	138	2141	2.07	1.17	2.90	5.11	3.39	0.81
18	141	2655	2.57	1.43	3.62	6.32	4.20	1.00
19	144	3235	3.13	1.80	4.36	7.63	5.16	1.25
20	147	3915	3.79	2.27	5.20	9.13	6.29	1.55
21	149	4711	4.56	2.80	6.18	10.79	7.51	1.95
22	152	5531	5.35	3.42	7.14	12.42	8.95	2.31
23	155	6538	6.33	4.13	8.37	14.44	10.60	2.80
24	158	7679	7.43	5.05	9.64	16.75	12.43	3.37
25	161	8896	8.61	5.96	11.07	19.19	14.42	3.97
26	163	10298	9.96	7.10	12.62	21.88	16.79	4.68
27	166	11792	11.41	8.31	14.29	24.74	19.26	5.42
28	169	13461	13.02	9.69	16.12	27.73	22.06	6.35
29	172	15272	14.78	11.25	18.06	30.76	24.94	7.46

Language Arts Literacy Grade 7								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
30	174	17215	16.66	12.86	20.19	33.85	28.11	8.65
31	177	19274	18.65	14.67	22.36	37.21	31.27	9.96
32	180	21419	20.73	16.60	24.56	40.65	34.42	11.39
33	183	23790	23.02	18.74	27.00	44.09	37.86	13.08
34	186	26262	25.41	20.98	29.53	47.59	41.34	14.97
35	188	28985	28.05	23.50	32.27	51.13	45.00	17.09
36	191	31840	30.81	26.11	35.16	54.71	48.67	19.42
37	194	34905	33.77	28.92	38.28	58.44	52.64	21.97
38	197	37883	36.66	31.69	41.26	61.82	56.23	24.61
39	200	41385	40.04	34.97	44.75	65.51	60.27	27.85
40	203	45028	43.57	38.42	48.35	69.26	64.25	31.31
41	206	48647	47.07	41.78	51.99	72.64	67.84	34.96
42	209	52520	50.82	45.50	55.76	76.07	71.42	38.95
43	212	56479	54.65	49.40	59.54	79.15	74.94	43.26
44	215	60544	58.58	53.34	63.46	82.18	78.35	47.72
45	218	64608	62.51	57.47	67.21	84.92	81.57	52.33
46	221	68675	66.45	61.65	70.91	87.34	84.33	57.18
47	225	72733	70.38	65.74	74.69	89.64	87.08	61.98
48	228	76774	74.29	69.88	78.40	91.77	89.54	66.87
49	232	80546	77.94	73.89	81.71	93.64	91.64	71.47
50	236	84179	81.45	77.79	84.87	95.08	93.54	76.04
51	240	87478	84.64	81.33	87.74	96.24	95.21	80.19
52	244	90620	87.68	84.80	90.38	97.34	96.45	84.18
53	250	93400	90.37	87.92	92.67	98.19	97.40	87.71
54	252	95818	92.71	90.70	94.59	98.65	98.24	90.85
55	256	97815	94.65	93.14	96.05	99.20	98.79	93.36
56	261	99373	96.15	95.03	97.20	99.44	99.24	95.38
57	265	100565	97.31	96.46	98.10	99.61	99.47	96.86
58	270	101510	98.22	97.68	98.73	99.78	99.70	97.98
59	275	102188	98.88	98.53	99.20	99.86	99.81	98.80
60	281	102642	99.32	99.10	99.52	99.92	99.92	99.30
61	287	102922	99.59	99.45	99.72	99.96	99.94	99.57
62	294	103107	99.77	99.68	99.85	99.98	99.98	99.75
63	300	103234	99.89	99.84	99.93	100.00	99.99	99.88
64	300	103302	99.96	99.93	99.98	100.00	99.99	99.95
65	300	103334	99.99	99.98	99.99	100.00	100.00	99.99
66	300	103341	99.99	99.99	100.00	100.00	100.00	100.00
67	300	103348	100.00	100.00	100.00	100.00	100.00	100.00

* Alternate and Braille forms excluded

Table F.6: LAL Grade 8

Language Arts Literacy Grade 8								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
2	113	1	0.00	0.00	0.00	0.00	0.00	0.00
3	122	4	0.00	0.00	0.01	0.01	0.00	0.01
4	128	14	0.01	0.00	0.02	0.03	0.02	0.01
5	133	22	0.02	0.01	0.03	0.05	0.04	0.01
6	137	55	0.05	0.03	0.08	0.14	0.09	0.02
7	140	93	0.09	0.05	0.13	0.21	0.15	0.04
8	143	143	0.14	0.07	0.20	0.28	0.24	0.07
9	146	208	0.20	0.10	0.30	0.43	0.36	0.09
10	149	295	0.29	0.14	0.43	0.66	0.49	0.13
11	151	391	0.38	0.18	0.57	0.88	0.66	0.16
12	153	508	0.50	0.23	0.74	1.19	0.81	0.21
13	156	660	0.65	0.31	0.96	1.60	1.05	0.25
14	158	848	0.83	0.42	1.20	2.11	1.33	0.31
15	160	1092	1.07	0.56	1.54	2.70	1.67	0.43
16	162	1371	1.34	0.73	1.91	3.44	2.09	0.53
17	164	1663	1.63	0.91	2.29	4.14	2.51	0.67
18	166	1985	1.94	1.11	2.72	4.96	2.95	0.80
19	168	2421	2.37	1.44	3.23	5.93	3.69	0.98
20	170	2905	2.84	1.80	3.82	7.08	4.51	1.18
21	172	3444	3.37	2.15	4.52	8.39	5.36	1.41
22	174	4033	3.95	2.52	5.28	9.68	6.28	1.68
23	176	4701	4.60	3.04	6.07	11.21	7.29	2.01
24	178	5447	5.33	3.53	7.02	13.00	8.52	2.32
25	180	6256	6.12	4.10	8.02	14.78	9.84	2.69
26	182	7172	7.02	4.78	9.11	16.82	11.38	3.08
27	184	8221	8.04	5.65	10.29	18.91	13.11	3.64
28	186	9307	9.10	6.53	11.52	21.22	14.86	4.17
29	188	10517	10.29	7.49	12.92	23.62	16.81	4.84
30	190	11788	11.53	8.52	14.36	26.01	18.84	5.57
31	192	13157	12.87	9.67	15.87	28.59	21.04	6.37
32	193	14605	14.29	10.98	17.40	31.04	23.34	7.27
33	195	16205	15.85	12.38	19.12	33.86	25.82	8.28
34	197	17780	17.39	13.80	20.77	36.46	28.29	9.30
35	200	19677	19.25	15.47	22.80	39.39	31.30	10.61
36	201	21718	21.24	17.21	25.04	42.53	34.39	12.03
37	203	23811	23.29	19.10	27.24	45.38	37.39	13.64
38	205	26065	25.50	21.12	29.61	48.55	40.55	15.40
39	207	28536	27.91	23.45	32.10	51.96	43.81	17.39
40	209	31006	30.33	25.71	34.66	55.22	47.06	19.41

Language Arts Literacy Grade 8								
		All Students*	Female	Male	Afr. A.	Hispanic	White	
		Cumulative	Cumul.	Cumul.	Cumul.	Cumul.	Cumul.	
Raw Score	Scale Score	#	%	%	%	%	%	%
41	211	33769	33.03	28.25	37.52	58.49	50.53	21.84
42	213	36698	35.90	30.97	40.52	61.82	53.98	24.53
43	215	39820	38.95	33.92	43.68	65.01	57.86	27.44
44	218	43162	42.22	37.05	47.07	68.51	61.71	30.65
45	220	46718	45.70	40.51	50.58	71.52	65.32	34.37
46	222	50306	49.21	43.98	54.13	75.00	68.74	38.06
47	225	54079	52.90	47.53	57.95	77.95	72.42	42.15
48	227	58000	56.74	51.31	61.85	80.58	75.80	46.65
49	230	62099	60.75	55.48	65.71	83.55	79.10	51.31
50	233	66192	64.75	59.54	69.66	86.23	82.42	55.99
51	236	70428	68.89	63.83	73.67	88.67	85.46	61.03
52	239	74590	72.96	68.09	77.57	90.78	88.29	66.07
53	242	78629	76.92	72.29	81.28	92.69	90.75	71.05
54	245	82481	80.68	76.35	84.78	94.41	92.79	75.82
55	250	86127	84.25	80.44	87.86	95.74	94.46	80.45
56	253	89500	87.55	84.36	90.56	97.04	95.92	84.64
57	257	92473	90.46	87.78	92.99	97.89	97.10	88.44
58	261	94988	92.92	90.75	94.97	98.52	98.00	91.60
59	265	97118	95.00	93.38	96.54	99.05	98.69	94.21
60	270	98748	96.60	95.51	97.62	99.39	99.18	96.15
61	275	99978	97.80	97.08	98.48	99.66	99.50	97.60
62	281	100904	98.70	98.25	99.14	99.79	99.70	98.68
63	287	101476	99.26	99.00	99.51	99.88	99.85	99.30
64	293	101839	99.62	99.47	99.76	99.94	99.94	99.67
65	300	102040	99.82	99.74	99.89	99.98	99.97	99.86
66	300	102144	99.92	99.89	99.95	99.99	99.98	99.94
67	300	102203	99.98	99.97	99.98	100.00	99.99	99.98
68	300	102223	100.00	99.99	100.00	100.00	100.00	100.00
69	300	102228	100.00	100.00	100.00	100.00	100.00	100.00

* Alternate, Braille, and Special Equating not included

Table F.7: Mathematics Grade 3

Mathematics Grade 3								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
0	100	1	0.00	0.00	0.00	0.01	0.00	0.00
1	100	6	0.01	0.00	0.01	0.01	0.01	0.00
2	100	13	0.01	0.00	0.02	0.04	0.01	0.01
3	100	34	0.03	0.02	0.04	0.13	0.03	0.01
4	100	78	0.08	0.06	0.10	0.24	0.08	0.04
5	110	166	0.16	0.13	0.20	0.50	0.22	0.06
6	119	354	0.35	0.30	0.40	1.04	0.52	0.11
7	126	663	0.66	0.56	0.75	1.82	1.03	0.22
8	133	1108	1.10	0.95	1.24	3.06	1.69	0.37
9	139	1671	1.66	1.42	1.88	4.53	2.57	0.56
10	144	2412	2.40	2.09	2.67	6.37	3.80	0.83
11	149	3226	3.20	2.85	3.53	8.32	5.15	1.14
12	154	4195	4.17	3.83	4.48	10.66	6.74	1.52
13	159	5256	5.22	4.85	5.56	13.09	8.36	2.04
14	163	6427	6.38	6.06	6.68	15.60	10.28	2.60
15	167	7681	7.63	7.32	7.91	18.07	12.46	3.23
16	171	9058	8.99	8.64	9.31	20.76	14.77	3.94
17	175	10492	10.42	10.05	10.75	23.24	17.04	4.81
18	179	12058	11.97	11.59	12.32	26.08	19.42	5.77
19	183	13795	13.70	13.27	14.08	29.07	21.90	6.94
20	186	15549	15.44	15.06	15.78	32.02	24.45	8.14
21	189	17445	17.32	17.00	17.61	34.93	27.19	9.51
22	193	19360	19.22	18.89	19.51	37.79	30.03	10.89
23	196	21242	21.09	20.79	21.35	40.41	32.64	12.38
24	200	23548	23.38	23.14	23.59	43.40	35.87	14.23
25	203	25807	25.63	25.54	25.68	46.34	38.74	16.18
26	206	28160	27.96	27.94	27.96	49.34	41.79	18.21
27	209	30664	30.45	30.43	30.44	52.48	44.87	20.44
28	212	33265	33.03	32.99	33.04	55.36	48.04	22.85
29	215	36001	35.75	35.78	35.69	58.16	51.18	25.56
30	219	38801	38.53	38.64	38.40	61.06	54.36	28.29
31	222	41786	41.49	41.66	41.31	64.09	57.48	31.35
32	225	44871	44.56	44.78	44.31	67.06	60.82	34.53
33	229	47952	47.61	47.86	47.36	69.82	64.03	37.81
34	232	51267	50.91	51.12	50.67	72.65	67.40	41.30
35	236	54836	54.45	54.74	54.15	75.58	70.71	45.24
36	239	58416	58.01	58.39	57.61	78.28	73.85	49.27
37	243	62029	61.59	62.10	61.08	81.20	76.87	53.33
38	250	65686	65.22	65.79	64.66	83.84	79.78	57.61

Mathematics Grade 3								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
39	252	69417	68.93	69.55	68.32	86.37	82.67	62.00
40	256	73297	72.78	73.53	72.05	88.64	85.37	66.81
41	261	77240	76.70	77.47	75.94	90.99	87.96	71.61
42	267	81036	80.47	81.24	79.72	92.94	90.30	76.29
43	273	84843	84.25	85.07	83.45	94.68	92.61	80.96
44	280	88423	87.80	88.52	87.11	96.21	94.58	85.38
45	288	91844	91.20	91.81	90.61	97.54	96.46	89.48
46	298	94805	94.14	94.62	93.68	98.37	97.67	93.14
47	300	97273	96.59	96.89	96.30	99.18	98.70	96.13
48	300	99196	98.50	98.60	98.40	99.71	99.44	98.31
49	300	100292	99.59	99.63	99.54	99.92	99.83	99.53
50	300	100708	100.00	100.00	100.00	100.00	100.00	100.00

* Alternate and Braille forms excluded

Table F.8: Mathematics Grade 4

Mathematics Grade 4								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
1	100	1	0.00	0.00	0.00	0.00	0.00	0.00
2	100	9	0.01	0.01	0.01	0.01	0.01	0.01
3	100	27	0.03	0.02	0.04	0.06	0.01	0.02
4	103	68	0.07	0.05	0.08	0.20	0.06	0.03
5	112	156	0.15	0.11	0.19	0.43	0.18	0.05
6	120	321	0.31	0.26	0.36	0.94	0.37	0.11
7	128	607	0.59	0.52	0.66	1.73	0.74	0.22
8	134	1019	1.00	0.88	1.10	2.89	1.32	0.37
9	140	1596	1.56	1.42	1.69	4.31	2.23	0.60
10	145	2299	2.25	2.07	2.41	6.03	3.36	0.86
11	150	3136	3.07	2.85	3.27	7.95	4.76	1.19
12	155	4087	4.00	3.67	4.30	10.20	6.31	1.58
13	159	5125	5.02	4.64	5.36	12.57	7.91	2.05
14	163	6260	6.13	5.70	6.51	15.16	9.59	2.59
15	167	7496	7.34	6.85	7.78	17.78	11.53	3.20
16	171	8813	8.63	8.06	9.14	20.28	13.58	3.94
17	175	10237	10.02	9.46	10.53	23.00	15.68	4.79
18	178	11742	11.50	10.97	11.96	25.67	18.01	5.70
19	182	13372	13.09	12.52	13.60	28.47	20.40	6.75
20	185	15137	14.82	14.26	15.32	31.22	22.92	8.00

Mathematics Grade 4								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
21	189	17039	16.68	16.13	17.17	34.21	25.70	9.29
22	192	19012	18.61	18.12	19.04	37.15	28.36	10.79
23	195	21093	20.65	20.22	21.02	40.16	31.25	12.37
24	200	23393	22.90	22.47	23.26	43.25	34.28	14.26
25	202	25826	25.28	24.98	25.52	46.57	37.43	16.27
26	205	28347	27.75	27.59	27.86	49.90	40.55	18.42
27	208	31055	30.40	30.40	30.37	53.09	43.76	20.90
28	211	33869	33.16	33.29	32.99	56.19	47.25	23.50
29	215	36847	36.07	36.26	35.85	59.39	50.77	26.30
30	218	39976	39.14	39.47	38.78	62.84	54.34	29.24
31	221	43227	42.32	42.74	41.88	66.05	57.73	32.53
32	224	46746	45.76	46.26	45.25	69.41	61.41	36.07
33	228	50307	49.25	49.96	48.53	72.30	64.92	39.89
34	231	53889	52.76	53.67	51.85	75.31	68.20	43.72
35	235	57685	56.47	57.59	55.38	78.24	71.65	47.88
36	239	61499	60.21	61.48	58.97	80.94	75.02	52.13
37	242	65385	64.01	65.45	62.62	83.58	78.16	56.63
38	246	69333	67.88	69.28	66.52	85.97	81.30	61.20
39	250	73216	71.68	73.15	70.26	88.39	84.01	65.85
40	255	77042	75.42	76.86	74.04	90.37	86.95	70.32
41	260	80932	79.23	80.61	77.92	92.60	89.31	74.97
42	265	84753	82.97	84.25	81.75	94.24	91.70	79.60
43	271	88378	86.52	87.61	85.47	95.89	93.89	83.93
44	278	91829	89.90	90.78	89.05	97.21	95.76	88.07
45	286	94905	92.91	93.61	92.24	98.25	97.24	91.76
46	295	97462	95.41	95.88	94.97	98.88	98.37	94.82
47	300	99498	97.41	97.71	97.11	99.44	99.13	97.14
48	300	100960	98.84	98.98	98.70	99.79	99.66	98.75
49	300	101826	99.68	99.75	99.62	99.94	99.89	99.67
50	300	102148	100.00	100.00	100.00	100.00	100.00	100.00

* Alternate and Braille forms excluded

Table F.9: Mathematics Grade 5

Mathematics Grade 5								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
0	100	1	0.00	0.00	0.00	0.01	0.00	0.00
1	100	7	0.01	0.00	0.01	0.03	0.01	0.00
2	100	16	0.02	0.01	0.02	0.06	0.02	0.00
3	110	62	0.06	0.05	0.07	0.21	0.08	0.02
4	120	155	0.15	0.11	0.19	0.46	0.20	0.06
5	128	303	0.30	0.24	0.35	0.89	0.42	0.10
6	135	647	0.63	0.54	0.72	1.73	0.95	0.23
7	141	1133	1.10	0.91	1.29	2.98	1.63	0.44
8	147	1775	1.73	1.44	2.00	4.65	2.58	0.68
9	152	2559	2.49	2.11	2.85	6.43	3.78	1.03
10	156	3480	3.39	2.98	3.78	8.46	5.18	1.47
11	161	4459	4.35	3.84	4.82	10.62	6.70	1.94
12	164	5538	5.40	4.82	5.94	13.00	8.27	2.48
13	168	6672	6.50	5.89	7.08	15.42	9.95	3.06
14	172	7845	7.64	6.94	8.31	17.89	11.74	3.67
15	175	9051	8.82	8.05	9.55	20.35	13.52	4.35
16	179	10340	10.08	9.31	10.79	22.79	15.43	5.11
17	182	11715	11.42	10.66	12.13	25.43	17.37	5.98
18	185	13239	12.90	12.08	13.67	28.39	19.53	6.90
19	188	14794	14.42	13.59	15.19	31.09	21.74	7.93
20	191	16454	16.03	15.25	16.77	33.81	24.09	9.09
21	194	18220	17.76	17.05	18.41	36.62	26.47	10.42
22	197	19936	19.43	18.79	20.01	39.31	28.79	11.68
23	200	21957	21.40	20.82	21.93	42.39	31.62	13.16
24	203	24006	23.39	23.02	23.73	45.44	34.30	14.76
25	206	26176	25.51	25.32	25.67	48.40	37.06	16.53
26	209	28517	27.79	27.70	27.85	51.48	39.97	18.52
27	212	30984	30.19	30.29	30.08	54.56	42.95	20.67
28	215	33560	32.70	32.93	32.47	57.60	46.13	22.95
29	218	36253	35.33	35.67	34.98	60.49	49.44	25.42
30	221	39020	38.02	38.50	37.54	63.40	52.77	28.00
31	224	42067	40.99	41.66	40.33	66.39	56.18	30.98
32	227	45086	43.94	44.70	43.18	69.07	59.32	34.10
33	230	48187	46.96	47.85	46.07	71.59	62.48	37.40
34	233	51531	50.22	51.25	49.20	74.54	65.92	40.80
35	237	54993	53.59	54.83	52.38	77.29	69.16	44.61
36	240	58526	57.03	58.33	55.76	79.88	72.40	48.54
37	244	62118	60.53	61.90	59.20	82.45	75.51	52.59
38	250	65894	64.21	65.57	62.89	84.92	78.58	57.01

Mathematics Grade 5								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
39	252	69690	67.91	69.33	66.53	87.22	81.67	61.42
40	256	73703	71.82	73.24	70.45	89.46	84.70	66.15
41	261	77640	75.66	77.01	74.35	91.60	87.52	70.84
42	266	81738	79.65	80.99	78.36	93.58	90.07	75.71
43	271	85658	83.47	84.71	82.28	95.22	92.42	80.46
44	278	89501	87.22	88.33	86.15	96.57	94.57	85.10
45	285	93094	90.72	91.63	89.84	97.76	96.39	89.44
46	293	96366	93.91	94.63	93.21	98.72	97.91	93.23
47	300	99141	96.61	97.06	96.18	99.38	98.97	96.38
48	300	101082	98.50	98.72	98.30	99.76	99.62	98.52
49	300	102229	99.62	99.64	99.61	99.96	99.93	99.65
50	300	102617	100.00	100.00	100.00	100.00	100.00	100.00

* Alternate and Braille forms excluded

Table F.10: Mathematics Grade 6

Mathematics Grade 6								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
1	100	4	0.00	0.00	0.01	0.01	0.01	0.00
2	100	19	0.02	0.01	0.02	0.05	0.04	0.00
3	113	71	0.07	0.05	0.09	0.16	0.10	0.04
4	123	168	0.16	0.11	0.21	0.44	0.21	0.08
5	131	373	0.36	0.27	0.45	1.00	0.45	0.17
6	138	733	0.71	0.53	0.89	1.92	0.92	0.33
7	144	1255	1.22	0.94	1.49	3.09	1.64	0.59
8	150	1986	1.93	1.48	2.36	4.88	2.60	0.93
9	154	2838	2.76	2.19	3.30	6.86	3.77	1.34
10	159	3997	3.89	3.18	4.57	9.67	5.36	1.87
11	163	5194	5.06	4.19	5.88	12.44	6.98	2.49
12	167	6461	6.29	5.38	7.16	15.10	8.67	3.23
13	171	7871	7.67	6.73	8.55	18.16	10.72	3.96
14	174	9452	9.21	8.17	10.18	21.61	12.78	4.83
15	178	11022	10.74	9.67	11.75	24.70	14.97	5.80
16	181	12746	12.42	11.40	13.37	27.91	17.52	6.85
17	184	14550	14.17	13.13	15.15	30.97	20.11	8.06
18	187	16387	15.96	15.00	16.86	34.39	22.47	9.31
19	190	18435	17.96	17.07	18.78	37.72	25.34	10.78

Mathematics Grade 6								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
20	193	20612	20.08	19.22	20.87	41.37	28.30	12.30
21	196	22822	22.23	21.50	22.91	44.72	31.30	13.99
22	200	25242	24.59	23.95	25.18	48.22	34.39	15.92
23	201	27757	27.04	26.48	27.55	51.63	37.65	17.97
24	204	30369	29.59	29.12	29.99	55.14	40.89	20.19
25	207	32997	32.15	31.79	32.44	58.30	44.12	22.51
26	209	35750	34.83	34.62	34.98	61.31	47.45	25.03
27	212	38629	37.63	37.52	37.69	64.36	50.81	27.79
28	215	41573	40.50	40.51	40.45	67.18	54.30	30.66
29	217	44642	43.49	43.48	43.47	70.17	57.78	33.68
30	220	47707	46.48	46.62	46.30	72.80	61.24	36.77
31	223	50900	49.59	49.86	49.29	75.44	64.48	40.17
32	226	54071	52.68	53.06	52.27	77.95	67.72	43.57
33	229	57285	55.81	56.32	55.28	80.24	70.88	47.10
34	232	60536	58.97	59.57	58.37	82.55	73.64	50.77
35	235	63890	62.24	62.95	61.54	84.79	76.51	54.60
36	238	67292	65.56	66.33	64.79	86.88	79.43	58.55
37	241	70778	68.95	69.72	68.19	88.88	82.40	62.52
38	245	74135	72.22	73.07	71.39	90.72	84.94	66.44
39	250	77416	75.42	76.39	74.46	92.26	87.39	70.35
40	253	80807	78.72	79.67	77.79	93.71	89.55	74.53
41	257	84154	81.98	82.91	81.08	95.14	91.63	78.65
42	262	87338	85.08	85.98	84.22	96.22	93.43	82.64
43	268	90552	88.22	89.09	87.37	97.22	95.13	86.54
44	274	93506	91.09	91.79	90.42	98.19	96.71	90.05
45	282	96343	93.86	94.48	93.26	98.91	97.87	93.41
46	292	98758	96.21	96.62	95.81	99.42	98.73	96.18
47	300	100702	98.10	98.36	97.86	99.75	99.50	98.22
48	300	102000	99.37	99.46	99.28	99.95	99.88	99.45
49	300	102648	100.00	100.00	100.00	100.00	100.00	100.00

* Alternate, Braille, and Special Equating not included

Table F.11: Mathematics Grade 7

Mathematics Grade 7								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
0	100	5	0.00	0.01	0.00	0.02	0.01	0.00
1	100	13	0.01	0.01	0.01	0.04	0.03	0.00
2	100	34	0.03	0.03	0.03	0.11	0.06	0.00
3	100	99	0.10	0.08	0.11	0.30	0.14	0.03
4	112	293	0.28	0.24	0.32	0.75	0.46	0.10
5	121	621	0.60	0.50	0.69	1.61	0.88	0.24
6	128	1182	1.14	0.96	1.31	2.93	1.74	0.49
7	134	2028	1.96	1.64	2.26	4.95	3.04	0.85
8	140	3027	2.93	2.40	3.41	7.48	4.51	1.28
9	145	4364	4.22	3.51	4.87	10.42	6.60	1.92
10	150	5858	5.67	4.83	6.44	13.90	8.80	2.62
11	155	7489	7.24	6.31	8.10	17.48	11.20	3.42
12	159	9304	9.00	8.01	9.91	21.32	13.83	4.39
13	163	11159	10.79	9.76	11.74	24.84	16.64	5.47
14	167	13117	12.69	11.62	13.67	28.67	19.53	6.63
15	170	15302	14.80	13.70	15.80	32.50	22.86	7.98
16	174	17442	16.87	15.77	17.87	36.09	25.92	9.45
17	177	19703	19.06	17.97	20.03	39.64	29.08	11.06
18	180	22112	21.39	20.41	22.26	43.28	32.46	12.87
19	184	24599	23.79	23.04	24.45	46.99	35.58	14.85
20	187	27340	26.45	25.78	27.02	50.68	39.19	17.11
21	190	29985	29.00	28.51	29.41	54.02	42.59	19.32
22	193	32788	31.72	31.45	31.91	57.37	46.15	21.74
23	196	35435	34.28	34.21	34.29	60.46	49.67	24.02
24	200	38291	37.04	37.17	36.86	63.54	52.99	26.65
25	202	41198	39.85	40.23	39.43	66.62	56.46	29.34
26	205	44053	42.61	43.21	42.00	69.38	59.83	32.07
27	208	47034	45.50	46.31	44.67	72.03	63.12	35.06
28	211	49853	48.22	49.20	47.25	74.54	66.08	37.92
29	214	52790	51.06	52.14	50.00	76.82	68.89	41.11
30	217	55669	53.85	55.03	52.69	78.98	71.80	44.13
31	220	58500	56.59	57.88	55.32	81.00	74.45	47.23
32	223	61366	59.36	60.67	58.07	83.12	76.95	50.39
33	226	64191	62.09	63.55	60.68	85.00	79.29	53.60
34	229	67034	64.84	66.42	63.31	86.71	81.65	56.89
35	233	69922	67.63	69.24	66.09	88.49	83.92	60.21
36	236	72700	70.32	71.97	68.73	89.99	85.91	63.51
37	240	75509	73.04	74.70	71.44	91.37	87.93	66.88
38	244	78255	75.69	77.40	74.06	92.68	89.80	70.14

Mathematics Grade 7								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
39	250	81147	78.49	80.18	76.88	94.12	91.43	73.62
40	253	83886	81.14	82.77	79.59	95.18	92.98	77.05
41	257	86600	83.77	85.30	82.31	96.14	94.30	80.40
42	263	89358	86.43	87.77	85.17	96.99	95.58	83.85
43	269	91948	88.94	90.05	87.88	97.80	96.65	87.08
44	276	94554	91.46	92.36	90.60	98.48	97.57	90.33
45	284	96990	93.82	94.58	93.09	99.05	98.42	93.26
46	295	99329	96.08	96.66	95.52	99.48	99.18	95.94
47	300	101244	97.93	98.26	97.62	99.86	99.66	97.95
48	300	102649	99.29	99.42	99.17	99.96	99.91	99.37
49	300	103382	100.00	100.00	100.00	100.00	100.00	100.00

* Alternate and Braille forms excluded

Table F.12: Mathematics Grade 8

Mathematics Grade 8								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
0	100	1	0.00	0.00	0.00	0.00	0.00	0.00
1	100	6	0.01	0.00	0.01	0.01	0.01	0.01
2	100	27	0.03	0.02	0.03	0.07	0.03	0.02
3	100	101	0.10	0.09	0.11	0.25	0.14	0.05
4	110	292	0.29	0.25	0.32	0.71	0.46	0.13
5	120	656	0.64	0.53	0.74	1.64	0.97	0.29
6	128	1246	1.22	1.00	1.43	3.16	1.78	0.58
7	135	2167	2.12	1.72	2.50	5.36	3.05	1.05
8	141	3354	3.28	2.72	3.81	8.19	4.78	1.64
9	147	4800	4.70	4.01	5.34	11.50	6.95	2.37
10	153	6467	6.33	5.48	7.12	15.13	9.34	3.29
11	158	8157	7.99	7.09	8.81	18.63	11.93	4.25
12	162	10001	9.79	8.76	10.74	22.35	14.70	5.35
13	167	11963	11.71	10.69	12.65	26.52	17.65	6.45
14	171	14077	13.78	12.70	14.77	30.43	20.88	7.74
15	175	16296	15.95	14.94	16.88	34.41	24.01	9.26
16	179	18517	18.13	17.20	18.96	38.22	27.06	10.85
17	183	20864	20.42	19.71	21.05	42.17	30.34	12.53
18	187	23375	22.88	22.32	23.36	46.09	33.71	14.44
19	191	25944	25.40	24.98	25.74	49.66	37.26	16.54
20	194	28543	27.94	27.73	28.08	53.40	40.59	18.69

Mathematics Grade 8								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
21	200	31341	30.68	30.66	30.63	56.93	44.27	21.10
22	202	34202	33.48	33.69	33.22	60.45	47.95	23.59
23	205	37115	36.33	36.74	35.87	63.65	51.52	26.31
24	209	40211	39.36	40.01	38.67	67.06	54.96	29.33
25	212	43305	42.39	43.26	41.50	70.08	58.31	32.41
26	216	46274	45.30	46.46	44.12	72.96	61.43	35.41
27	219	49417	48.38	49.79	46.97	75.60	64.66	38.73
28	223	52598	51.49	53.04	49.95	78.15	67.85	42.16
29	226	55649	54.48	56.16	52.81	80.43	71.04	45.43
30	230	58737	57.50	59.34	55.70	82.57	74.03	48.84
31	233	61797	60.49	62.34	58.69	84.72	76.64	52.33
32	237	64810	63.44	65.40	61.53	86.73	79.09	55.80
33	240	67792	66.36	68.52	64.26	88.45	81.44	59.28
34	244	70805	69.31	71.59	67.10	89.96	83.83	62.84
35	250	73758	72.20	74.53	69.95	91.52	86.12	66.34
36	252	76680	75.06	77.41	72.79	92.81	88.13	69.92
37	256	79424	77.75	80.04	75.54	93.95	89.97	73.30
38	261	82127	80.40	82.64	78.24	95.01	91.60	76.62
39	265	84751	82.96	85.12	80.89	96.10	93.08	79.87
40	270	87282	85.44	87.38	83.58	96.89	94.38	83.01
41	276	89776	87.88	89.67	86.17	97.60	95.67	86.08
42	281	92065	90.12	91.77	88.55	98.23	96.67	88.84
43	288	94266	92.28	93.65	90.97	98.73	97.59	91.46
44	295	96293	94.26	95.42	93.15	99.16	98.34	93.86
45	300	98080	96.01	96.86	95.20	99.46	98.98	95.84
46	300	99594	97.49	98.07	96.94	99.73	99.46	97.53
47	300	100863	98.74	99.04	98.45	99.88	99.78	98.83
48	300	101697	99.55	99.67	99.44	99.95	99.96	99.62
49	300	102153	100.00	100.00	100.00	100.00	100.00	100.00

* Alternate, Braille, and Spanish forms not included

Table F.13: Science Grade 4

Science Grade 4								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
1	100	2	0.00	0.00	0.00	0.01	0.00	0.00
2	100	12	0.01	0.00	0.02	0.04	0.01	0.00
3	114	27	0.03	0.01	0.04	0.06	0.04	0.01

Science Grade 4								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
4	127	67	0.07	0.06	0.07	0.14	0.12	0.03
5	137	212	0.21	0.18	0.23	0.45	0.40	0.06
6	145	435	0.43	0.39	0.46	0.98	0.78	0.14
7	152	820	0.80	0.71	0.89	1.92	1.47	0.24
8	159	1333	1.31	1.14	1.45	3.19	2.37	0.38
9	165	2048	2.01	1.80	2.18	4.79	3.56	0.65
10	171	2929	2.87	2.57	3.14	6.74	5.24	0.91
11	176	3993	3.91	3.57	4.22	9.06	7.16	1.30
12	181	5225	5.12	4.71	5.49	11.58	9.47	1.75
13	186	6697	6.56	6.09	6.98	14.62	12.08	2.35
14	191	8333	8.16	7.65	8.63	17.96	14.95	3.04
15	195	10176	9.97	9.53	10.36	21.60	18.26	3.86
16	200	12394	12.14	11.78	12.45	25.58	21.83	5.10
17	204	14786	14.48	14.25	14.67	29.90	25.55	6.43
18	209	17602	17.24	17.14	17.30	34.79	29.79	8.13
19	213	20660	20.23	20.15	20.28	39.29	34.31	10.23
20	217	24147	23.65	23.78	23.49	44.40	39.21	12.76
21	222	28130	27.55	27.85	27.23	49.53	44.54	15.94
22	226	32511	31.84	32.39	31.28	55.04	49.96	19.61
23	231	37236	36.46	37.39	35.56	60.57	55.31	23.90
24	235	42308	41.43	42.60	40.30	65.80	60.71	28.90
25	240	47818	46.83	48.35	45.37	71.21	66.11	34.54
26	245	53394	52.29	53.95	50.69	75.63	71.39	40.56
27	250	59234	58.01	59.83	56.26	80.32	76.22	47.05
28	255	65190	63.84	65.67	62.08	84.61	80.80	53.89
29	260	71227	69.75	71.65	67.93	88.16	85.09	61.14
30	266	77213	75.61	77.41	73.90	91.38	88.85	68.56
31	273	82745	81.03	82.66	79.48	93.77	91.99	75.52
32	280	87917	86.10	87.49	84.77	95.89	94.68	82.13
33	287	92463	90.55	91.64	89.51	97.48	96.67	87.95
34	296	96098	94.11	94.85	93.40	98.58	98.10	92.62
35	300	98974	96.92	97.34	96.53	99.40	99.13	96.26
36	300	100762	98.68	98.88	98.48	99.81	99.64	98.48
37	300	101705	99.60	99.66	99.54	99.96	99.92	99.57
38	300	102027	99.91	99.93	99.90	100.00	99.99	99.92
39	300	102115	100.00	100.00	100.00	100.00	100.00	100.00

* Alternate and Braille forms excluded

Table F.14: Science Grade 8

Science Grade 8								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
4	116	6	0.01	0.00	0.01	0.02	0.00	0.00
5	124	14	0.01	0.01	0.02	0.04	0.01	0.01
6	131	41	0.04	0.02	0.06	0.11	0.05	0.02
7	137	82	0.08	0.05	0.11	0.20	0.09	0.04
8	143	159	0.16	0.09	0.22	0.43	0.19	0.07
9	148	312	0.31	0.16	0.44	0.85	0.41	0.13
10	152	538	0.53	0.30	0.73	1.45	0.72	0.22
11	156	888	0.87	0.54	1.17	2.34	1.22	0.36
12	160	1394	1.36	0.89	1.80	3.65	1.90	0.59
13	164	2041	2.00	1.38	2.57	5.09	2.95	0.89
14	168	2838	2.78	2.03	3.47	6.96	4.25	1.23
15	171	3762	3.68	2.83	4.47	9.22	5.84	1.58
16	174	4860	4.75	3.75	5.68	11.84	7.53	2.08
17	177	6135	6.00	4.95	6.97	14.74	9.44	2.72
18	180	7533	7.37	6.26	8.39	17.89	11.66	3.38
19	183	9044	8.85	7.76	9.85	21.05	14.22	4.13
20	186	10750	10.52	9.51	11.44	24.36	16.93	5.08
21	189	12638	12.36	11.36	13.27	28.17	19.95	6.07
22	192	14540	14.22	13.36	15.00	31.49	22.96	7.25
23	194	16544	16.18	15.51	16.78	34.91	26.12	8.53
24	197	18744	18.34	17.86	18.74	38.71	29.44	9.98
25	200	21086	20.63	20.41	20.79	42.66	33.12	11.48
26	202	23571	23.06	23.06	23.02	46.50	36.64	13.28
27	205	26201	25.63	26.05	25.19	50.27	40.54	15.26
28	208	28959	28.33	29.08	27.57	54.06	44.36	17.45
29	210	31744	31.05	32.19	29.93	57.97	47.84	19.72
30	213	34677	33.92	35.36	32.51	61.38	51.70	22.30
31	215	37607	36.79	38.52	35.09	64.77	55.11	24.96
32	218	40752	39.87	41.94	37.84	67.94	59.00	27.89
33	221	43923	42.97	45.40	40.61	71.11	62.52	31.03
34	224	47330	46.30	49.10	43.60	74.19	65.90	34.54
35	226	50735	49.63	52.69	46.68	77.21	69.24	38.08
36	229	54251	53.07	56.34	49.92	79.94	72.48	41.90
37	232	57738	56.48	59.98	53.12	82.30	75.60	45.75
38	235	61267	59.94	63.69	56.32	84.54	78.51	49.77
39	239	64914	63.50	67.40	59.75	86.88	81.38	53.99
40	242	68503	67.01	70.82	63.36	89.06	84.08	58.20
41	245	72044	70.48	74.22	66.88	90.84	86.51	62.45
42	250	75571	73.93	77.50	70.49	92.44	88.71	66.82

Science Grade 8								
		All Students*		Female	Male	Afr. A.	Hispanic	White
		Cumulative		Cumul.	Cumul.	Cumul.	Cumul.	Cumul.
Raw Score	Scale Score	#	%	%	%	%	%	%
43	253	79067	77.35	80.79	74.05	93.91	90.74	71.21
44	257	82523	80.73	83.93	77.66	95.23	92.72	75.46
45	262	85805	83.94	86.88	81.13	96.35	94.33	79.60
46	266	88948	87.02	89.67	84.48	97.27	95.75	83.58
47	272	91800	89.81	92.11	87.60	98.01	96.87	87.25
48	278	94449	92.40	94.23	90.64	98.67	97.96	90.58
49	285	96765	94.66	96.01	93.37	99.15	98.70	93.52
50	293	98705	96.56	97.50	95.66	99.52	99.24	95.91
51	300	100246	98.07	98.64	97.52	99.81	99.60	97.78
52	300	101370	99.17	99.47	98.88	99.95	99.85	99.10
53	300	102016	99.80	99.88	99.72	100.00	99.95	99.80
54	300	102221	100.00	100.00	100.00	100.00	100.00	100.00

* Alternate and Braille forms excluded

APPENDIX G

ITEM PARAMETERS TABLES

Table G.1: LAL Grade 3: – Item Parameters

Item ¹	Measure	Anchor	Error	INFIT		OUTFIT		Displace	Score Corr.
				MNSQ	ZSTD	MNSQ	ZSTD		
1	-0.6067	No	0.0130	1.19	9.90	1.48	9.90	0.00	0.25
2	-1.5891	No	0.0155	1.00	-0.52	1.10	5.02	-0.01	0.36
3	-0.3702	No	0.0127	1.04	6.64	1.09	8.58	0.00	0.38
4	-1.3970	No	0.0149	0.93	-9.34	0.87	-7.33	0.00	0.44
5	-1.3897	No	0.0148	1.05	6.17	1.39	9.90	0.00	0.31
6	0.2882	No	0.0123	1.27	9.90	1.51	9.90	0.00	0.20
7	-0.7724	No	0.0133	0.95	-7.63	0.95	-4.33	0.00	0.44
8	-0.0186	No	0.0124	0.99	-1.52	1.02	2.71	0.00	0.42
9	-0.3923	No	0.0128	1.12	9.90	1.27	9.90	0.00	0.32
10	-0.2729	No	0.0126	1.02	3.07	1.05	4.57	0.00	0.40
11	-0.8571	No	0.0135	1.01	1.58	1.08	5.77	0.00	0.39
12	-0.4628	No	0.0128	0.99	-2.49	1.00	-0.27	0.00	0.42
13	-0.0985	No	0.0125	1.11	9.90	1.25	9.90	0.00	0.33
14	-1.3736	No	0.0148	0.98	-2.65	0.98	-1.31	0.00	0.39
15	-1.2950	No	0.0146	0.91	-9.90	0.83	-9.90	0.00	0.45
16	-0.9220	No	0.0136	1.01	1.48	1.04	2.62	0.00	0.39
17	-0.0866	No	0.0125	1.13	9.90	1.24	9.90	0.00	0.31
18	-0.5061	No	0.0129	0.99	-2.11	1.02	1.47	0.00	0.42
19	0.4343	No	0.0085	0.84	-9.90	0.84	-9.90	0.00	0.54
20	0.3868	No	0.0083	0.78	-9.90	0.78	-9.90	0.00	0.57
21	1.3713	No	0.0101	0.91	-9.90	0.91	-9.90	0.00	0.55
22	2.6313	No	0.0090	1.01	0.82	1.01	1.01	0.00	0.51
23	2.2504	No	0.0099	1.02	2.43	1.02	2.17	0.00	0.48

¹ Item indicates the order in which items were entered in Winsteps

Table G.2: LAL Grade 4: – Item Parameters

ITEM ¹	Measure	Anchor	Error	INFIT		OUTFIT		Displace	Score Corr.
				MNSQ	ZSTD	MNSQ	ZSTD		
1	-2.0765	No	0.0182	0.90	-8.78	0.71	-9.90	-0.01	0.42
2	-0.7104	No	0.0134	1.00	0.76	1.01	0.96	0.00	0.40
3	-1.2773	No	0.0149	0.89	-9.90	0.76	-9.90	0.00	0.47
4	-1.4853	No	0.0156	0.94	-6.91	0.90	-5.08	0.00	0.42
5	-1.8239	No	0.0170	0.91	-8.47	0.77	-9.90	-0.01	0.42
6	-0.4310	No	0.0130	1.06	9.90	1.10	8.42	0.00	0.35
7	-0.0932	No	0.0126	1.08	9.90	1.17	9.90	0.00	0.34
8	-1.2502	No	0.0148	0.99	-0.70	1.01	0.64	0.00	0.38
9	-0.9990	No	0.0141	0.89	-9.90	0.79	-9.90	0.00	0.49
10	-0.9018	No	0.0138	1.05	6.74	1.07	4.89	0.00	0.35
11	-0.4272	No	0.0130	0.93	-9.90	0.91	-8.32	0.00	0.47
12	0.1686	No	0.0124	1.09	9.90	1.18	9.90	0.00	0.33
13	-0.5728	No	0.0132	1.13	9.90	1.21	9.90	0.00	0.29
14	-0.6076	No	0.0132	0.94	-9.90	0.89	-9.60	0.00	0.46
15	-0.3562	No	0.0129	1.03	5.44	1.03	2.67	0.00	0.38
16	0.0289	No	0.0125	0.92	-9.90	0.92	-8.59	0.00	0.47
17	-0.8167	No	0.0136	1.08	9.90	1.13	9.36	0.00	0.33
18	-0.2754	No	0.0128	1.02	3.66	1.08	7.44	0.00	0.39
19	-2.5128	No	0.0209	0.94	-4.32	0.90	-3.25	-0.01	0.34
20	-2.0354	No	0.0180	0.94	-5.10	0.78	-9.18	-0.01	0.38
21	-1.1703	No	0.0145	1.01	0.95	0.99	-0.81	0.00	0.38
22	0.1556	No	0.0124	1.25	9.90	1.45	9.90	0.00	0.21
23	-1.8737	No	0.0172	0.86	-9.90	0.64	-9.90	-0.01	0.47
24	-0.7365	No	0.0135	1.13	9.90	1.34	9.90	0.00	0.28
25	0.5350	No	0.0089	0.90	-9.90	0.90	-9.90	0.00	0.49
26	-0.4630	No	0.0084	0.79	-9.90	0.78	-9.90	0.00	0.58
27	1.5226	No	0.0109	1.01	0.68	1.01	0.88	0.00	0.45
28	3.1409	No	0.0094	1.25	9.90	1.27	9.90	0.00	0.32
29	1.6266	No	0.0088	1.09	9.90	1.11	9.90	0.00	0.48

¹ Item indicates the order in which items were entered in Winsteps

Table G.3: LAL Grade 5: – Item Parameters

Item ¹	Measure	Anchor	Error	INFIT		OUTFIT		Displace	Score Corr.
				MNSQ	ZSTD	MNSQ	ZSTD		
1	-0.6699	No	0.0131	1.05	7.98	1.10	8.99	0.00	0.29
2	-2.4460	No	0.0213	0.93	-4.22	0.84	-6.04	0.00	0.31
3	-0.3038	No	0.0124	1.03	5.03	1.05	5.72	0.00	0.33
4	-2.0612	No	0.0186	0.86	-9.90	0.65	-9.90	0.00	0.43
5	-0.6717	No	0.0131	0.99	-1.65	0.96	-3.57	0.00	0.36
6	-0.9983	No	0.0139	0.89	-9.90	0.79	-9.90	0.00	0.46
7	-0.7860	No	0.0133	1.01	2.06	1.07	6.06	0.00	0.32
8	0.6282	No	0.0119	1.08	9.90	1.13	9.90	0.00	0.27
9	0.2772	No	0.0119	0.98	-4.22	0.99	-0.81	0.00	0.37
10	-0.1691	No	0.0122	1.12	9.90	1.18	9.90	0.00	0.24
11	-1.0010	No	0.0139	0.86	-9.90	0.74	-9.90	0.00	0.48
12	-1.4567	No	0.0155	0.91	-9.90	0.78	-9.90	0.00	0.41
13	-1.2345	No	0.0146	0.94	-6.87	0.89	-7.58	0.00	0.38
14	-0.4745	No	0.0127	1.08	9.90	1.16	9.90	0.00	0.26
15	-0.1424	No	0.0122	1.08	9.90	1.13	9.90	0.00	0.28
16	-0.3363	No	0.0124	1.11	9.90	1.15	9.90	0.00	0.24
17	-0.1411	No	0.0122	1.01	2.92	1.02	2.15	0.00	0.34
18	-0.2184	No	0.0123	1.09	9.90	1.14	9.90	0.00	0.26
19	0.0459	No	0.0120	0.96	-9.90	0.94	-8.68	0.00	0.40
20	-0.6789	No	0.0131	0.96	-7.35	0.92	-8.05	0.00	0.39
21	-0.8480	No	0.0135	0.93	-9.90	0.88	-9.90	0.00	0.41
22	-0.7260	No	0.0132	1.01	1.65	1.01	1.19	0.00	0.33
23	-1.3075	No	0.0149	0.95	-6.26	0.88	-8.14	0.00	0.37
24	0.3905	No	0.0119	1.08	9.90	1.12	9.90	0.00	0.28
25	-1.8143	No	0.0172	0.91	-7.72	0.80	-9.90	0.00	0.38
26	0.0752	No	0.0120	1.06	9.90	1.08	9.90	0.00	0.29
27	-0.1017	No	0.0121	0.96	-8.67	0.94	-8.68	0.00	0.40
28	-0.0366	No	0.0121	1.09	9.90	1.20	9.90	0.00	0.26
29	-0.8158	No	0.0134	0.93	-9.90	0.89	-9.57	0.00	0.41
30	-0.7703	No	0.0133	1.01	1.17	1.01	0.95	0.00	0.33
31	-0.4164	No	0.0049	1.11	9.90	1.11	9.90	0.00	0.58
32	0.2395	No	0.0053	1.13	9.90	1.13	9.90	0.00	0.55
33	3.0130	No	0.0104	0.91	-9.90	0.91	-9.90	0.00	0.48
34	2.3152	No	0.0104	0.88	-9.90	0.88	-9.90	0.00	0.51
35	1.7975	No	0.0102	0.92	-9.90	0.92	-9.90	0.00	0.48

¹ Item indicates the order in which items were entered in Winsteps

Table G.4: LAL Grade 6: – Item Parameters

Item ¹	Measure	Anchor	Error	INFIT		OUTFIT		Displace	Score Corr.
				MNSQ	ZSTD	MNSQ	ZSTD		
1	-0.3537	No	0.0139	0.88	-9.90	0.80	-9.90	0.00	0.50
2	0.8093	No	0.0127	1.12	9.90	1.18	9.90	0.00	0.28
3	-0.1503	No	0.0135	1.08	9.90	1.08	7.32	0.00	0.31
4	-1.1256	No	0.0163	1.00	0.29	0.97	-1.78	0.00	0.33
5	-1.7175	No	0.0193	0.99	-0.67	0.85	-6.14	0.00	0.31
6	-1.2281	No	0.0168	0.86	-9.90	0.67	-9.90	0.00	0.48
7	0.1092	No	0.0131	1.07	9.90	1.07	7.14	0.00	0.32
8	-0.0137	No	0.0133	1.12	9.90	1.22	9.90	0.00	0.27
9	-1.5981	No	0.0186	0.89	-9.36	0.70	-9.90	0.00	0.42
10	-1.7592	Yes	0.0196	0.86	-9.90	0.64	-9.90	-0.10	0.38
11	-0.8609	Yes	0.0153	0.94	-7.22	0.86	-9.03	-0.04	0.40
12	-0.3506	Yes	0.0139	0.92	-9.90	0.85	-9.90	-0.01	0.46
13	0.9968	Yes	0.0127	1.09	9.90	1.16	9.90	-0.16	0.31
14	0.1880	Yes	0.0130	1.14	9.90	1.19	9.90	0.13	0.28
15	-0.6752	Yes	0.0147	1.00	0.54	1.04	2.99	0.03	0.37
16	0.6978	Yes	0.0127	1.05	9.33	1.08	9.90	-0.03	0.34
17	-0.0071	Yes	0.0133	0.97	-4.79	0.95	-5.13	-0.10	0.39
18	0.6028	Yes	0.0127	1.07	9.90	1.09	9.90	-0.06	0.31
19	-1.1050	No	0.0162	0.98	-2.19	0.93	-3.82	0.00	0.36
20	0.1317	No	0.0131	1.22	9.90	1.35	9.90	0.00	0.18
21	1.0436	No	0.0127	1.04	8.43	1.11	9.90	0.00	0.33
22	-1.0244	No	0.0159	0.84	-9.90	0.70	-9.90	0.00	0.51
23	-0.5533	No	0.0144	0.90	-9.90	0.90	-7.70	0.00	0.46
24	0.1372	No	0.0131	0.96	-7.75	0.93	-8.01	0.00	0.43
25	-0.4219	No	0.0141	0.99	-1.02	1.00	-0.21	0.00	0.38
26	-0.7467	No	0.0149	1.07	8.83	1.19	9.90	0.00	0.28
27	-0.7418	No	0.0149	0.93	-9.41	0.82	-9.90	0.00	0.44
28	-0.5980	No	0.0145	1.05	6.65	1.10	6.89	0.00	0.32
29	0.0181	No	0.0132	1.03	5.66	1.05	4.90	0.00	0.36
30	-0.5686	No	0.0144	0.98	-2.31	1.04	3.24	0.00	0.38
31	0.3111	No	0.0129	1.03	6.72	1.07	8.80	0.00	0.36
32	-0.1128	No	0.0134	1.06	9.90	1.14	9.90	0.00	0.32
33	-0.2970	No	0.0138	1.10	9.90	1.18	9.90	0.00	0.28
34	-0.1974	No	0.0136	0.90	-9.90	0.84	-9.90	0.00	0.48
35	0.4046	No	0.0128	0.99	-2.88	0.98	-2.03	0.00	0.40
36	0.4674	No	0.0128	1.09	9.90	1.13	9.90	0.00	0.30
37	0.7618	No	0.0049	1.18	9.90	1.18	9.90	0.00	0.63
38	0.3669	No	0.0075	0.86	-9.90	0.86	-9.90	0.00	0.64
39	0.8525	No	0.0096	0.94	-7.12	0.94	-6.99	0.00	0.52
40	0.3962	Yes	0.0078	0.76	-9.90	0.75	-9.90	0.09	0.65
41	1.5136	No	0.0090	0.83	-9.90	0.82	-9.90	0.00	0.62
42	1.6664	No	0.0092	0.83	-9.90	0.83	-9.90	0.00	0.61

¹ Item indicates the order in which items were entered in Winsteps

Table G.5: LAL Grade 7: – Item Parameters

Item ¹	Measure	Anchor	Error	INFIT		OUTFIT		Displace	Score Corr.
				MNSQ	ZSTD	MNSQ	ZSTD		
1	-0.0960	No	0.0122	1.03	5.36	1.04	5.34	0.00	0.35
2	-1.1145	No	0.0142	0.93	-9.44	0.88	-9.14	0.00	0.41
3	-1.0611	No	0.0141	1.03	3.89	1.07	5.46	0.00	0.31
4	0.1754	No	0.0120	0.93	-9.90	0.92	-9.90	0.00	0.44
5	-1.1024	No	0.0142	0.89	-9.90	0.76	-9.90	0.00	0.46
6	-1.2635	No	0.0147	1.03	3.43	1.12	7.45	0.00	0.29
7	-1.8875	No	0.0175	0.90	-8.87	0.79	-9.90	0.00	0.39
8	-1.4889	No	0.0156	1.01	1.49	1.14	7.60	0.00	0.29
9	-1.5145	No	0.0157	0.85	-9.90	0.68	-9.90	0.00	0.48
10	0.5390	No	0.0119	1.11	9.90	1.17	9.90	0.00	0.27
11	-0.5182	No	0.0128	1.01	0.96	1.02	2.00	0.00	0.36
12	0.4178	No	0.0119	0.98	-3.99	0.99	-2.25	0.00	0.39
13	-0.3504	No	0.0125	1.01	1.07	0.99	-0.69	0.00	0.37
14	-0.8134	No	0.0134	0.93	-9.90	0.89	-9.90	0.00	0.43
15	0.8803	No	0.0120	1.12	9.90	1.24	9.90	0.00	0.23
16	-0.7440	No	0.0132	1.00	0.68	1.00	-0.38	0.00	0.35
17	-0.3220	No	0.0125	1.08	9.90	1.11	9.90	0.00	0.29
18	0.0145	No	0.0121	0.98	-5.28	0.98	-2.90	0.00	0.40
19	-0.2745	No	0.0124	1.05	9.33	1.08	8.89	0.00	0.32
20	0.8538	No	0.0120	1.03	7.47	1.10	9.90	0.00	0.33
21	-0.3511	No	0.0125	0.96	-7.74	0.94	-6.73	0.00	0.41
22	0.9732	No	0.0121	1.16	9.90	1.25	9.90	0.00	0.21
23	0.2540	No	0.0119	1.04	7.91	1.06	9.44	0.00	0.34
24	-0.1591	No	0.0122	1.05	9.55	1.06	8.07	0.00	0.33
25	-0.5572	No	0.0128	1.02	2.60	1.03	3.05	0.00	0.35
26	-0.0982	No	0.0122	1.00	-0.61	1.01	0.99	0.00	0.38
27	-1.0499	No	0.0140	1.03	4.32	1.04	2.67	0.00	0.31
28	0.7496	Yes	0.0120	1.09	9.90	1.14	9.90	0.16	0.27
29	-1.0864	Yes	0.0142	0.94	-7.51	0.90	-7.58	-0.09	0.35
30	-0.5281	Yes	0.0128	1.04	7.16	1.04	4.41	0.10	0.36
31	-1.1479	Yes	0.0143	0.86	-9.90	0.78	-9.90	-0.15	0.41
32	-0.3983	Yes	0.0126	1.06	9.90	1.09	9.39	0.04	0.32
33	-0.2458	Yes	0.0123	0.96	-8.91	0.91	-9.90	-0.08	0.40
34	0.3497	Yes	0.0119	1.05	9.90	1.08	9.90	-0.03	0.32
35	0.2231	Yes	0.0119	0.89	-9.90	0.87	-9.90	0.00	0.48
36	1.0856	No	0.0122	1.08	9.90	1.15	9.90	0.00	0.28
37	-0.0551	No	0.0044	1.21	9.90	1.22	9.90	0.00	0.61
38	0.1906	No	0.0072	0.90	-9.90	0.90	-9.90	0.00	0.60
39	0.3537	No	0.0095	0.89	-9.90	0.88	-9.90	0.00	0.53
40	-0.0305	No	0.0078	0.86	-9.90	0.86	-9.90	0.00	0.61
41	-0.0914	No	0.0087	0.86	-9.90	0.86	-9.90	0.00	0.58
42	0.0357	Yes	0.0095	0.86	-9.90	0.86	-9.90	-0.02	0.52

¹ Item indicates the order in which items were entered in Winsteps

Table G.6: LAL Grade 8: – Item Parameters

Item ¹	Measure	Anchor	Error	INFIT		OUTFIT		Displace	Score Corr.
				MNSQ	ZSTD	MNSQ	ZSTD		
1	-0.2664	No	0.0143	0.94	-8.40	0.93	-4.81	0.00	0.43
2	-0.6697	No	0.0157	0.85	-9.90	0.66	-9.90	0.00	0.49
3	0.3739	No	0.0129	1.00	0.15	0.96	-3.29	0.00	0.41
4	0.2857	No	0.0130	0.98	-2.78	0.96	-3.48	0.00	0.42
5	-0.3219	No	0.0145	0.95	-6.80	0.85	-9.57	0.00	0.43
6	0.9397	No	0.0122	1.08	9.90	1.12	9.90	0.00	0.34
7	0.8291	No	0.0123	1.15	9.90	1.33	9.90	0.00	0.29
8	0.6321	No	0.0125	0.90	-9.90	0.88	-9.90	0.00	0.50
9	0.3566	No	0.0129	0.98	-4.10	0.97	-2.39	0.00	0.43
10	-0.4432	No	0.0149	0.92	-9.90	0.74	-9.90	0.00	0.45
11	0.2851	No	0.0130	0.93	-9.90	0.90	-8.98	0.00	0.47
12	0.9868	No	0.0122	0.99	-1.54	1.00	0.43	0.00	0.42
13	0.3934	No	0.0128	1.00	-0.03	1.01	0.61	0.00	0.41
14	1.0219	No	0.0122	0.99	-2.03	0.98	-2.91	0.00	0.42
15	1.0045	No	0.0122	0.92	-9.90	0.89	-9.90	0.00	0.48
16	0.4155	No	0.0128	0.95	-9.28	0.87	-9.90	0.00	0.46
17	0.0811	No	0.0134	0.95	-6.98	0.91	-6.87	0.00	0.44
18	0.3395	No	0.0129	1.15	9.90	1.26	9.90	0.00	0.28
19	-0.2011	No	0.0141	0.95	-6.38	1.01	0.41	0.00	0.42
20	1.4660	No	0.0121	1.05	9.90	1.11	9.90	0.00	0.37
21	-0.0458	No	0.0137	1.14	9.90	1.31	9.90	0.00	0.26
22	0.3205	No	0.0130	1.00	0.42	1.04	3.08	0.00	0.40
23	0.4288	No	0.0128	1.09	9.90	1.19	9.90	0.00	0.33
24	0.0149	No	0.0136	0.96	-5.85	0.96	-2.77	0.00	0.43
25	0.2036	No	0.0132	0.90	-9.90	0.86	-9.90	0.00	0.49
26	1.3124	No	0.0121	1.08	9.90	1.12	9.90	0.00	0.35
27	-0.1697	No	0.0141	1.05	6.81	1.14	8.90	0.00	0.33
28	0.1925	Yes	0.0132	0.98	-3.62	1.00	-0.19	-0.12	0.38
29	0.9628	Yes	0.0122	1.17	9.90	1.26	9.90	0.08	0.29
30	1.2935	Yes	0.0121	1.01	1.15	1.03	3.46	-0.04	0.41
31	-0.2377	Yes	0.0143	1.04	5.71	1.20	9.90	-0.03	0.32
32	0.9352	Yes	0.0122	1.13	9.90	1.24	9.90	0.03	0.32
33	-0.7233	Yes	0.0160	1.04	3.83	1.43	9.90	0.06	0.32
34	0.2318	Yes	0.0131	0.97	-5.45	0.97	-2.79	-0.05	0.42
35	0.0497	Yes	0.0135	1.10	9.90	1.15	9.90	0.11	0.35
36	0.7623	Yes	0.0124	1.04	7.80	1.03	2.78	0.13	0.40
37	0.8984	No	0.0049	1.13	9.90	1.15	9.90	0.00	0.65
38	1.2540	No	0.0077	0.88	-9.90	0.88	-9.90	0.00	0.63
39	0.9295	No	0.0099	0.88	-9.90	0.87	-9.90	0.00	0.56
40	1.7481	No	0.0091	0.91	-9.90	0.91	-9.90	0.00	0.56
41	1.3610	No	0.0097	0.91	-9.90	0.91	-9.90	0.00	0.55
42	1.6763	Yes	0.0094	0.87	-9.90	0.87	-9.90	-0.10	0.57

¹ Item indicates the order in which items were entered in Winsteps

Table G.7: Mathematics Grade 3: – Item Parameters

Item ¹	Measure	Anchor	Error	INFIT		OUTFIT		Displace	Score Corr.
				MNSQ	ZSTD	MNSQ	ZSTD		
1	-0.2043	No	0.0134	1.09	9.90	1.19	9.90	0.00	0.31
2	0.8281	No	0.0122	0.93	-9.90	0.90	-9.90	0.00	0.49
3	0.4003	No	0.0125	1.17	9.90	1.22	9.90	0.00	0.26
4	0.3821	No	0.0125	0.94	-9.90	0.91	-9.72	0.00	0.47
5	0.2555	Yes	0.0127	1.02	4.58	0.98	-1.67	-0.03	0.39
6	-1.1907	No	0.0167	0.88	-9.90	0.73	-9.90	0.00	0.44
7	-0.8755	No	0.0154	1.00	-0.43	0.94	-3.13	0.00	0.35
8	0.0424	Yes	0.0130	0.85	-9.90	0.77	-9.90	-0.06	0.54
9	-0.6074	No	0.0145	0.85	-9.90	0.72	-9.90	0.00	0.51
10	0.7131	No	0.0123	1.10	9.90	1.16	9.90	0.00	0.33
11	-0.2184	No	0.0135	0.98	-2.95	0.94	-4.76	0.00	0.41
12	0.0327	No	0.0130	1.03	4.41	1.00	-0.31	0.00	0.39
13	-0.1077	No	0.0132	0.96	-6.00	0.91	-7.70	0.00	0.44
14	0.1845	No	0.0127	0.84	-9.90	0.79	-9.90	0.00	0.56
15	-0.3295	No	0.0137	1.11	9.90	1.32	9.90	0.00	0.27
16	-0.5087	No	0.0142	1.06	8.37	1.17	9.90	0.00	0.31
17	0.6687	Yes	0.0123	1.04	7.72	1.08	9.12	-0.06	0.39
18	-0.4347	Yes	0.0140	1.17	9.90	1.27	9.90	0.31	0.36
19	0.6671	No	0.0123	1.03	5.92	1.03	4.07	0.00	0.40
20	0.0099	Yes	0.0130	0.88	-9.90	0.80	-9.90	-0.11	0.49
21	0.0449	Yes	0.0130	1.11	9.90	1.21	9.90	-0.08	0.28
22	0.1808	Yes	0.0128	0.85	-9.90	0.81	-9.90	-0.09	0.53
23	1.1241	No	0.0122	1.03	7.09	1.08	9.90	0.00	0.37
24	-0.1009	Yes	0.0132	0.93	-9.90	0.83	-9.90	0.05	0.49
25	0.0199	Yes	0.0130	0.97	-5.29	0.94	-5.52	0.27	0.52
26	0.4758	Yes	0.0124	0.96	-8.19	0.94	-7.43	-0.28	0.42
27	0.2640	Yes	0.0126	0.92	-9.90	0.85	-9.90	-0.02	0.48
28	0.0846	No	0.0129	1.11	9.90	1.19	9.90	0.00	0.31
29	0.8048	Yes	0.0122	0.87	-9.90	0.84	-9.90	0.01	0.54
30	-0.6753	No	0.0147	0.92	-9.90	0.81	-9.90	0.00	0.45
31	0.6438	No	0.0123	1.01	2.95	1.03	4.08	0.00	0.41
32	0.6438	No	0.0123	1.02	3.60	1.05	6.19	0.00	0.41
33	-0.5315	No	0.0142	1.06	7.34	1.19	9.90	0.00	0.31
34	0.3204	No	0.0126	1.04	6.56	1.05	5.16	0.00	0.39
35	0.6539	No	0.0123	0.98	-4.60	0.97	-3.14	0.00	0.44
36	-0.8865	No	0.0154	1.05	5.08	1.17	8.49	0.00	0.29
37	0.0428	No	0.0130	0.92	-9.90	0.89	-9.90	0.00	0.48
38	-0.0514	Yes	0.0131	1.03	4.86	1.07	5.86	0.02	0.38
39	0.1001	Yes	0.0129	0.94	-9.90	0.89	-9.90	0.11	0.50
40	0.4523	Yes	0.0124	0.89	-9.90	0.84	-9.90	0.04	0.53
41	1.8416	No	0.0128	0.91	-9.90	0.84	-9.90	0.00	0.48
42	0.0940	Yes	0.0066	1.57	9.90	2.03	9.90	-0.02	0.42
43	0.7726	No	0.0062	1.10	9.90	1.14	9.90	0.00	0.62
44	0.8777	No	0.0067	1.08	9.90	1.10	9.90	0.00	0.60

¹ Item indicates the order in which items were entered in Winsteps

Table G.8: Mathematics Grade 4: – Item Parameters

Item ¹	Measure	Anchor	Error	INFIT		OUTFIT		Displace	Score Corr.
				MNSQ	ZSTD	MNSQ	ZSTD		
1	-0.7579	No	0.0146	0.96	-4.55	0.90	-6.73	0.00	0.39
2	-0.2917	No	0.0134	0.98	-3.24	0.94	-5.21	0.00	0.40
3	0.8097	No	0.0122	1.05	9.90	1.08	9.90	0.00	0.35
4	-0.0390	No	0.0129	1.05	9.51	1.08	7.34	0.00	0.34
5	0.4612	Yes	0.0123	0.96	-9.23	0.92	-9.90	0.03	0.45
6	-0.8462	No	0.0149	0.90	-9.90	0.81	-9.90	0.00	0.44
7	0.3335	Yes	0.0124	1.11	9.90	1.16	9.90	0.10	0.32
8	-0.1990	No	0.0132	1.04	6.81	1.05	4.57	0.00	0.34
9	-0.3869	No	0.0136	0.96	-6.43	0.95	-3.88	0.00	0.41
10	-1.4070	No	0.0173	0.90	-8.84	0.80	-9.30	0.00	0.39
11	-0.1306	No	0.0131	1.00	0.84	1.01	1.03	0.00	0.38
12	0.9399	Yes	0.0122	0.94	-9.90	0.93	-9.36	-0.03	0.46
13	0.2331	No	0.0125	0.84	-9.90	0.79	-9.90	0.00	0.55
14	0.7227	No	0.0122	0.97	-6.61	0.96	-5.91	0.00	0.43
15	0.3682	No	0.0124	1.02	3.51	1.01	1.70	0.00	0.39
16	0.3925	Yes	0.0124	0.88	-9.90	0.84	-9.90	-0.17	0.50
17	0.2205	No	0.0126	1.05	9.90	1.07	8.06	0.00	0.35
18	0.3625	Yes	0.0124	0.95	-9.90	0.94	-7.68	-0.01	0.45
19	0.6157	Yes	0.0123	0.95	-9.90	0.93	-9.43	0.09	0.46
20	0.9585	Yes	0.0122	1.11	9.90	1.17	9.90	0.17	0.30
21	0.5189	Yes	0.0123	0.85	-9.90	0.80	-9.90	0.14	0.56
22	-0.0405	No	0.0129	1.01	2.23	0.99	-0.63	0.00	0.38
23	0.2873	Yes	0.0125	0.94	-9.90	0.90	-9.90	-0.15	0.43
24	0.5030	No	0.0123	0.87	-9.90	0.82	-9.90	0.00	0.53
25	-0.4470	No	0.0137	0.99	-1.27	0.92	-6.50	0.00	0.39
26	-0.2120	No	0.0132	0.93	-9.90	0.85	-9.90	0.00	0.45
27	-0.2171	Yes	0.0132	1.11	9.90	1.15	9.90	0.13	0.32
28	0.5871	No	0.0123	0.96	-8.49	0.94	-8.47	0.00	0.44
29	-0.5440	Yes	0.0140	1.08	9.90	1.08	5.51	0.19	0.38
30	-0.5231	No	0.0139	1.06	8.21	1.17	9.90	0.00	0.30
31	0.3027	No	0.0125	1.06	9.90	1.09	9.90	0.00	0.35
32	0.3515	No	0.0124	1.08	9.90	1.12	9.90	0.00	0.33
33	0.4880	No	0.0123	1.08	9.90	1.10	9.90	0.00	0.33
34	-0.2953	No	0.0134	0.89	-9.90	0.84	-9.90	0.00	0.49
35	0.9803	No	0.0122	0.99	-1.18	1.01	1.97	0.00	0.41
36	-1.7071	Yes	0.0190	0.93	-5.70	1.02	0.61	-0.09	0.26
37	-1.0922	No	0.0159	0.83	-9.90	0.69	-9.90	0.00	0.49
38	0.1759	Yes	0.0126	0.99	-2.56	1.02	1.66	-0.05	0.40
39	-1.6653	No	0.0188	0.93	-5.17	1.01	0.40	0.00	0.32
40	0.7082	Yes	0.0122	0.88	-9.90	0.85	-9.90	-0.12	0.51
41	0.1776	Yes	0.0126	0.87	-9.90	0.82	-9.90	-0.03	0.52
42	1.2833	No	0.0066	1.20	9.90	1.24	9.90	0.00	0.53
43	0.5005	Yes	0.0069	1.18	9.90	1.22	9.90	-0.07	0.50
44	0.3676	No	0.0066	1.56	9.90	1.81	9.90	0.00	0.38

¹ Item indicates the order in which items were entered in Winsteps

Table G.9: Mathematics Grade 5: – Item Parameters

Item ¹	Measure	Anchor	Error	INFIT		OUTFIT		Displace	Score Corr.
				MNSQ	ZSTD	MNSQ	ZSTD		
1	1.1308	No	0.0125	0.93	-9.90	0.95	-6.56	0.00	0.49
2	0.5217	No	0.0127	0.85	-9.90	0.77	-9.90	0.00	0.57
3	-0.6626	No	0.0150	1.02	2.11	1.16	8.19	0.00	0.36
4	1.3728	No	0.0126	1.16	9.90	1.27	9.90	0.00	0.32
5	-0.0084	No	0.0134	1.12	9.90	1.17	9.90	0.00	0.33
6	0.0739	No	0.0133	0.85	-9.90	0.78	-9.90	0.00	0.56
7	0.3921	No	0.0129	0.95	-8.37	0.92	-7.89	0.00	0.48
8	0.4897	Yes	0.0128	1.15	9.90	1.12	9.90	0.03	0.33
9	1.0193	No	0.0125	0.93	-9.90	0.94	-7.49	0.00	0.50
10	0.1572	Yes	0.0132	0.92	-9.90	0.86	-9.90	0.27	0.57
11	0.4261	Yes	0.0128	1.08	9.90	1.10	9.37	0.02	0.39
12	-0.3490	No	0.0141	0.94	-8.83	0.92	-5.12	0.00	0.46
13	1.4226	No	0.0126	1.07	9.90	1.17	9.90	0.00	0.37
14	-0.5526	Yes	0.0147	0.94	-8.51	0.93	-4.03	-0.23	0.36
15	0.0028	Yes	0.0134	0.83	-9.90	0.72	-9.90	-0.04	0.56
16	-0.1542	Yes	0.0137	1.04	5.95	1.10	6.77	-0.24	0.32
17	0.1015	Yes	0.0132	1.03	4.44	1.05	4.25	0.08	0.43
18	0.8923	No	0.0125	0.98	-4.50	0.99	-1.20	0.00	0.47
19	-0.8520	No	0.0156	0.95	-6.06	0.92	-3.80	0.00	0.41
20	-0.1915	No	0.0138	1.04	5.25	1.09	6.19	0.00	0.38
21	0.0774	No	0.0133	0.99	-1.44	1.00	0.31	0.00	0.44
22	0.6068	No	0.0127	1.19	9.90	1.24	9.90	0.00	0.30
23	0.4982	No	0.0128	0.95	-8.52	0.92	-7.78	0.00	0.49
24	-1.4076	No	0.0181	1.10	7.99	1.64	9.90	0.00	0.21
25	0.4143	No	0.0128	0.90	-9.90	0.86	-9.90	0.00	0.53
26	0.8243	No	0.0126	1.17	9.90	1.25	9.90	0.00	0.32
27	0.4933	No	0.0128	0.98	-2.88	0.97	-3.10	0.00	0.46
28	0.5528	No	0.0127	1.07	9.90	1.11	9.90	0.00	0.40
29	-0.4165	No	0.0143	0.97	-3.59	0.92	-5.27	0.00	0.43
30	0.6305	No	0.0127	1.17	9.90	1.33	9.90	0.00	0.31
31	-0.4330	Yes	0.0143	1.03	4.31	0.95	-3.32	0.24	0.47
32	-0.2705	Yes	0.0139	0.85	-9.90	0.70	-9.90	0.00	0.55
33	0.4807	Yes	0.0128	1.08	9.90	1.12	9.90	0.09	0.40
34	-0.5192	Yes	0.0146	1.05	5.98	1.15	8.29	-0.05	0.33
35	0.5278	No	0.0127	0.84	-9.90	0.79	-9.90	0.00	0.58
36	0.6725	Yes	0.0126	1.06	9.90	1.08	8.23	-0.13	0.40
37	0.2670	No	0.0130	0.86	-9.90	0.77	-9.90	0.00	0.56
38	0.1890	No	0.0131	0.95	-8.51	1.00	0.08	0.00	0.48
39	-0.3422	No	0.0141	0.88	-9.90	0.85	-9.81	0.00	0.50
40	0.4131	No	0.0128	0.98	-4.48	0.95	-5.24	0.00	0.47
41	1.2492	No	0.0125	0.90	-9.90	0.85	-9.90	0.00	0.53
42	0.5973	Yes	0.0070	1.23	9.90	1.28	9.90	-0.03	0.57
43	1.4346	No	0.0078	0.92	-9.90	0.91	-9.90	0.00	0.65

¹ Item indicates the order in which items were entered in Winsteps

Table G.10: Mathematics Grade 6: – Item Parameters

Item ¹	Measure	Anchor	Error	INFIT		OUTFIT		Displace	Score Corr.
				MNSQ	ZSTD	MNSQ	ZSTD		
1	-0.5184	No	0.0134	0.96	-5.94	0.87	-9.81	0.00	0.42
2	0.6885	Yes	0.0122	1.10	9.90	1.15	9.90	0.09	0.32
3	1.1257	No	0.0124	1.05	9.90	1.11	9.90	0.00	0.37
4	-1.0166	No	0.0147	1.10	9.90	1.31	9.90	0.00	0.24
5	-0.2890	No	0.0130	1.07	9.90	1.14	9.90	0.00	0.33
6	-0.4049	No	0.0132	0.91	-9.90	0.84	-9.90	0.00	0.48
7	-0.0104	No	0.0126	1.15	9.90	1.27	9.90	0.00	0.27
8	0.9092	No	0.0122	1.17	9.90	1.30	9.90	0.00	0.26
9	-0.8548	Yes	0.0142	0.99	-0.78	1.01	0.78	-0.05	0.34
10	-0.0406	No	0.0126	0.92	-9.90	0.87	-9.90	0.00	0.48
11	0.7488	No	0.0122	1.08	9.90	1.13	9.90	0.00	0.33
12	0.3702	No	0.0123	0.91	-9.90	0.85	-9.90	0.00	0.50
13	-0.3731	No	0.0131	1.06	9.90	1.12	9.14	0.00	0.33
14	-1.5258	No	0.0168	1.00	-0.42	0.93	-3.11	0.00	0.32
15	1.4292	No	0.0127	0.99	-2.32	1.04	4.15	0.00	0.41
16	1.5304	No	0.0128	0.91	-9.90	0.89	-9.90	0.00	0.48
17	-0.5227	No	0.0134	1.05	7.64	1.15	9.90	0.00	0.33
18	-0.2524	No	0.0129	0.90	-9.90	0.93	-6.35	0.00	0.49
19	1.3418	Yes	0.0126	1.10	9.90	1.18	9.90	-0.07	0.34
20	0.6056	No	0.0122	1.09	9.90	1.17	9.90	0.00	0.34
21	-0.6702	No	0.0137	0.98	-2.59	0.94	-4.31	0.00	0.39
22	-0.1802	No	0.0128	0.95	-9.90	0.94	-5.38	0.00	0.45
23	-1.1986	No	0.0154	1.05	5.50	1.13	6.31	0.00	0.28
24	0.3188	Yes	0.0123	1.01	3.05	1.01	0.98	0.28	0.44
25	-0.4705	No	0.0133	0.97	-4.80	0.92	-5.82	0.00	0.42
26	-0.2651	No	0.0129	0.95	-9.78	0.92	-6.84	0.00	0.45
27	1.1788	No	0.0124	0.89	-9.90	0.87	-9.90	0.00	0.50
28	-0.3740	Yes	0.0131	1.05	7.53	1.12	9.25	-0.21	0.28
29	-0.4051	Yes	0.0132	0.86	-9.90	0.77	-9.90	-0.10	0.50
30	-0.9403	Yes	0.0145	0.81	-9.90	0.68	-9.90	-0.05	0.52
31	0.1005	No	0.0124	0.99	-2.18	0.99	-0.89	0.00	0.42
32	0.4850	Yes	0.0122	1.00	-0.71	0.99	-1.23	0.09	0.43
33	0.2732	No	0.0123	0.86	-9.90	0.81	-9.90	0.00	0.54
34	-0.5320	Yes	0.0134	0.94	-8.91	1.03	2.28	-0.04	0.41
35	-0.0877	Yes	0.0127	0.95	-9.90	0.91	-8.90	-0.02	0.45
36	-0.0337	No	0.0126	0.99	-2.22	0.97	-3.18	0.00	0.42
37	0.4350	No	0.0122	1.05	9.44	1.06	7.56	0.00	0.38
38	0.3014	No	0.0123	0.89	-9.90	0.84	-9.90	0.00	0.52
39	-0.6599	No	0.0137	0.88	-9.90	0.80	-9.90	0.00	0.49
40	0.6251	No	0.0122	0.83	-9.90	0.78	-9.90	0.00	0.57
41	0.9988	No	0.0078	1.14	9.90	1.16	9.90	0.00	0.50
42	-0.2035	Yes	0.0068	1.18	9.90	1.50	9.90	0.00	0.51
43	0.3835	No	0.0065	0.97	-4.69	0.97	-2.94	0.00	0.65

¹ Item indicates the order in which items were entered in Winsteps

Table G.11: Mathematics Grade 7: – Item Parameters

Item ¹	Measure	Anchor	Error	INFIT		OUTFIT		Displace	Score Corr.
				MNSQ	ZSTD	MNSQ	ZSTD		
1	-0.2657	No	0.0108	0.92	-9.90	0.85	-9.90	0.00	0.51
2	-0.5967	No	0.0112	1.04	8.18	1.05	4.55	0.00	0.39
3	0.5315	No	0.0104	1.05	9.90	1.10	9.90	0.00	0.41
4	-0.6770	Yes	0.0113	0.86	-9.90	0.76	-9.90	0.05	0.55
5	-0.5574	No	0.0111	0.99	-1.81	0.94	-5.57	0.00	0.44
6	0.0570	No	0.0105	0.87	-9.90	0.81	-9.90	0.00	0.56
7	1.1054	No	0.0106	1.19	9.90	1.35	9.90	0.00	0.30
8	-0.0294	No	0.0106	1.13	9.90	1.17	9.90	0.00	0.35
9	-1.4029	No	0.0130	0.95	-7.31	0.89	-6.50	0.00	0.41
10	-0.3494	No	0.0109	0.86	-9.90	0.77	-9.90	0.00	0.55
11	-0.6721	No	0.0113	0.99	-1.28	1.07	5.81	0.00	0.42
12	0.8721	No	0.0104	1.12	9.90	1.26	9.90	0.00	0.34
13	-0.7459	No	0.0115	0.99	-1.02	1.09	7.28	0.00	0.41
14	-0.3335	No	0.0109	1.15	9.90	1.20	9.90	0.00	0.32
15	-0.5688	No	0.0112	0.94	-9.90	0.92	-7.32	0.00	0.47
16	0.1065	No	0.0105	0.89	-9.90	0.84	-9.90	0.00	0.54
17	1.5613	No	0.0110	1.07	9.90	1.21	9.90	0.00	0.37
18	0.7431	Yes	0.0104	1.00	-0.14	1.02	3.10	-0.14	0.46
19	0.0407	No	0.0105	1.16	9.90	1.24	9.90	0.00	0.33
20	-0.1958	Yes	0.0107	0.82	-9.90	0.79	-9.90	-0.14	0.56
21	-0.2419	Yes	0.0108	0.88	-9.90	0.80	-9.90	-0.13	0.52
22	0.3285	Yes	0.0104	1.14	9.90	1.17	9.90	0.15	0.36
23	-0.7872	No	0.0115	1.03	5.31	1.15	9.90	0.00	0.38
24	-1.3490	Yes	0.0129	1.06	7.78	1.26	9.90	-0.01	0.30
25	1.1868	No	0.0106	0.95	-9.90	0.98	-3.04	0.00	0.48
26	-1.4005	No	0.0130	0.92	-9.90	0.88	-6.88	0.00	0.42
27	-0.0514	No	0.0106	1.12	9.90	1.23	9.90	0.00	0.36
28	0.1835	No	0.0104	1.11	9.90	1.14	9.90	0.00	0.38
29	0.5218	No	0.0104	1.21	9.90	1.34	9.90	0.00	0.30
30	-0.4464	No	0.0110	1.01	1.44	0.97	-3.15	0.00	0.43
31	0.3321	No	0.0104	0.96	-9.90	0.93	-9.63	0.00	0.50
32	0.2827	Yes	0.0104	1.18	9.90	1.25	9.90	0.00	0.32
33	-1.3099	No	0.0127	0.90	-9.90	0.87	-8.32	0.00	0.44
34	1.3484	No	0.0108	0.95	-9.90	0.93	-7.85	0.00	0.48
35	-0.4095	Yes	0.0109	0.89	-9.90	0.87	-9.90	0.08	0.54
36	1.2101	Yes	0.0107	0.95	-9.90	0.91	-9.90	0.20	0.46
37	-0.5239	No	0.0111	0.83	-9.90	0.78	-9.90	0.00	0.56
38	-0.2826	No	0.0108	0.91	-9.90	0.86	-9.90	0.00	0.51
39	0.2254	No	0.0104	0.92	-9.90	0.89	-9.90	0.00	0.52
40	0.6177	Yes	0.0104	0.97	-6.65	0.97	-4.32	0.28	0.49
41	1.4481	Yes	0.0058	1.00	-0.06	0.99	-0.96	-0.10	0.65
42	0.3295	No	0.0056	1.04	6.53	1.04	4.39	0.00	0.66
43	0.3636	No	0.0054	0.89	-9.90	0.87	-9.90	0.00	0.72

¹ Item indicates the order in which items were entered in Winsteps

Table G.12: Mathematics Grade 8: – Item Parameters

Item ¹	Measure	Anchor	Error	INFIT		OUTFIT		Displace	Score Corr.
				MNSQ	ZSTD	MNSQ	ZSTD		
1	-1.7115	No	0.0163	0.88	-9.90	0.70	-9.90	0.00	0.40
2	0.3014	No	0.0115	0.91	-9.90	0.84	-9.90	0.00	0.53
3	-0.3495	No	0.0122	0.91	-9.90	0.86	-9.90	0.00	0.49
4	0.8809	No	0.0114	0.91	-9.90	0.89	-9.90	0.00	0.53
5	0.1718	No	0.0116	1.13	9.90	1.25	9.90	0.00	0.35
6	0.4127	Yes	0.0115	0.98	-3.98	0.94	-7.47	0.24	0.50
7	0.3359	No	0.0115	1.10	9.90	1.12	9.90	0.00	0.38
8	-0.4183	No	0.0123	1.07	9.90	1.14	9.90	0.00	0.36
9	-1.6092	No	0.0158	0.98	-1.62	1.01	0.42	0.00	0.32
10	0.8262	No	0.0114	0.99	-1.71	0.98	-2.57	0.00	0.47
11	1.3010	No	0.0117	1.07	9.90	1.13	9.90	0.00	0.41
12	0.3390	No	0.0115	1.07	9.90	1.08	9.24	0.00	0.41
13	-0.2389	Yes	0.0120	0.88	-9.90	0.81	-9.90	-0.15	0.49
14	-0.3815	Yes	0.0123	0.90	-9.90	0.85	-9.90	-0.07	0.48
15	0.2734	Yes	0.0115	0.97	-6.21	0.92	-8.69	0.00	0.48
16	1.1765	Yes	0.0116	1.08	9.90	1.15	9.90	0.23	0.38
17	0.2313	Yes	0.0116	0.99	-1.85	1.01	1.61	0.01	0.46
18	0.1203	No	0.0116	0.98	-3.39	1.03	3.11	0.00	0.46
19	0.1579	No	0.0116	0.87	-9.90	0.83	-9.90	0.00	0.55
20	-0.5926	No	0.0126	1.05	7.29	1.21	9.90	0.00	0.36
21	1.0071	No	0.0115	1.15	9.90	1.26	9.90	0.00	0.34
22	0.0165	No	0.0117	1.15	9.90	1.37	9.90	0.00	0.32
23	-1.2604	No	0.0144	0.89	-9.90	0.70	-9.90	0.00	0.45
24	0.5786	Yes	0.0114	0.94	-9.90	0.91	-9.90	-0.18	0.51
25	1.3682	No	0.0117	1.22	9.90	1.39	9.90	0.00	0.30
26	0.7588	No	0.0114	0.99	-1.95	1.03	3.65	0.00	0.47
27	0.0511	Yes	0.0117	0.93	-9.90	0.87	-9.90	-0.28	0.46
28	0.7394	Yes	0.0114	1.20	9.90	1.28	9.90	0.26	0.32
29	-0.5728	No	0.0126	1.11	9.90	1.12	8.32	0.00	0.33
30	-0.8522	No	0.0132	0.90	-9.90	0.82	-9.90	0.00	0.46
31	0.9428	No	0.0115	1.10	9.90	1.16	9.90	0.00	0.39
32	0.4274	Yes	0.0115	0.98	-5.03	0.94	-6.58	-0.10	0.47
33	0.7970	No	0.0114	0.91	-9.90	0.87	-9.90	0.00	0.54
34	1.3090	No	0.0117	0.90	-9.90	0.86	-9.90	0.00	0.54
35	1.7970	No	0.0123	0.92	-9.90	0.84	-9.90	0.00	0.52
36	-0.6357	Yes	0.0127	0.88	-9.90	0.80	-9.90	0.04	0.51
37	0.4313	No	0.0115	1.03	6.47	1.03	2.97	0.00	0.44
38	-0.1202	No	0.0119	0.92	-9.90	0.91	-8.85	0.00	0.50
39	0.7043	No	0.0114	0.90	-9.90	0.87	-9.90	0.00	0.55
40	1.9200	No	0.0125	0.83	-9.90	0.72	-9.90	0.00	0.57
41	1.3835	No	0.0066	1.03	3.45	1.00	0.09	0.00	0.65
42	0.8272	Yes	0.0067	1.12	9.90	1.12	9.90	-0.02	0.61
43	0.8312	No	0.0061	1.01	1.12	1.00	-0.39	0.00	0.68

¹ Item indicates the order in which items were entered in Winsteps

Table G.13: Science Grade 4: – Item Parameters

Item ¹	Measure	Anchor	Error	INFIT		OUTFIT		Displace	Score Corr.
				MNSQ	ZSTD	MNSQ	ZSTD		
1	0.1541	No	0.0063	1.10	9.90	1.16	9.90	0.00	0.16
2	0.4032	No	0.0059	1.03	7.58	1.04	6.01	0.00	0.26
3	-0.0698	No	0.0068	1.03	3.77	1.02	1.76	0.00	0.23
4	0.0777	No	0.0064	0.93	-9.90	0.90	-9.90	0.00	0.37
5	0.4158	No	0.0059	1.04	8.57	1.04	6.88	0.00	0.26
6	-0.4240	No	0.0082	0.91	-8.71	0.80	-9.90	0.00	0.34
7	0.4742	No	0.0059	0.98	-5.98	0.96	-6.91	0.00	0.33
8	0.3753	No	0.0059	1.01	3.03	1.01	0.88	0.00	0.29
9	0.7671	No	0.0059	1.07	9.90	1.11	9.90	0.00	0.22
10	0.5063	No	0.0059	0.96	-9.24	0.95	-9.54	0.00	0.35
11	0.6349	No	0.0058	1.01	1.87	1.01	1.61	0.00	0.30
12	0.2119	No	0.0062	0.98	-3.48	0.99	-1.65	0.00	0.31
13	0.9551	No	0.0061	1.10	9.90	1.19	9.90	0.00	0.16
14	0.4769	No	0.0059	1.08	9.90	1.10	9.90	0.00	0.21
15	0.2073	Yes	0.0062	1.08	9.90	1.09	9.90	0.02	0.21
16	0.2776	Yes	0.0061	0.92	-9.90	0.88	-9.90	0.05	0.42
17	0.3569	Yes	0.0060	1.00	-0.01	1.04	6.25	0.00	0.30
18	0.5409	Yes	0.0058	1.01	1.38	1.01	2.15	0.04	0.31
19	0.4074	Yes	0.0059	1.07	9.90	1.09	9.90	0.05	0.24
20	-0.0882	Yes	0.0068	1.01	1.93	1.03	2.32	0.03	0.28
21	0.0990	No	0.0064	0.88	-9.90	0.80	-9.90	0.00	0.44
22	0.7599	No	0.0059	0.99	-2.95	0.99	-1.15	0.00	0.32
23	0.5964	No	0.0058	1.06	9.90	1.08	9.90	0.00	0.23
24	0.1996	No	0.0062	1.01	2.71	1.05	6.34	0.00	0.27
25	0.3592	No	0.0060	0.96	-8.69	0.95	-8.33	0.00	0.35
26	-0.2437	No	0.0074	0.93	-8.29	0.87	-9.60	0.00	0.33
27	0.0898	No	0.0064	0.93	-9.90	0.88	-9.90	0.00	0.37
28	0.4292	No	0.0059	0.96	-9.90	0.94	-9.67	0.00	0.35
29	0.3983	No	0.0059	1.15	9.90	1.19	9.90	0.00	0.13
30	0.5846	Yes	0.0058	0.94	-9.90	0.93	-9.90	-0.19	0.37
31	0.0569	No	0.0065	1.04	6.19	1.05	5.48	0.00	0.23
32	0.4619	No	0.0059	1.02	3.90	1.03	5.75	0.00	0.29
33	0.1812	No	0.0062	1.03	6.06	1.05	6.52	0.00	0.25
34	1.0551	No	0.0034	0.94	-9.56	0.92	-9.90	0.00	0.50
35	0.5969	Yes	0.0036	1.03	4.25	1.02	3.19	0.00	0.49

¹ Item indicates the order in which items were entered in Winsteps

Table G.14: Science Grade 8: – Item Parameters

Item ¹	Measure	Anchor	Error	INFIT		OUTFIT		Displace	Score Corr
				MNSQ	ZSTD	MNSQ	ZSTD		
1	-0.2082	No	0.0102	1.00	-0.44	0.96	-5.09	0.00	0.35
2	-0.0714	No	0.0101	1.00	0.15	0.98	-3.07	0.00	0.35
3	0.0284	No	0.0100	1.10	9.90	1.12	9.90	0.00	0.25
4	0.2896	No	0.0098	1.03	8.92	1.03	5.70	0.00	0.33
5	0.5353	No	0.0098	0.90	-9.90	0.88	-9.90	0.00	0.47
6	0.1274	No	0.0099	1.01	3.99	1.01	1.69	0.00	0.35
7	-1.0293	No	0.0119	0.91	-9.90	0.80	-9.90	0.00	0.40
8	0.3661	No	0.0098	1.06	9.90	1.08	9.90	0.00	0.31
9	-0.3524	No	0.0104	0.98	-3.83	0.94	-7.36	0.00	0.36
10	0.6152	No	0.0098	1.02	5.93	1.01	2.89	0.00	0.34
11	0.1775	No	0.0099	1.08	9.90	1.10	9.90	0.00	0.28
12	0.9012	No	0.0099	0.94	-9.90	0.94	-9.90	0.00	0.42
13	0.0613	No	0.0100	0.96	-9.90	0.93	-9.90	0.00	0.40
14	0.2745	No	0.0098	0.96	-9.90	0.94	-9.90	0.00	0.41
15	-0.1761	Yes	0.0102	0.93	-9.90	0.89	-9.90	0.03	0.44
16	-0.2046	No	0.0102	0.93	-9.90	0.87	-9.90	0.00	0.43
17	-0.7727	Yes	0.0112	0.88	-9.90	0.85	-9.90	-0.18	0.35
18	-0.0189	No	0.0100	1.05	9.90	1.11	9.90	0.00	0.29
19	0.1128	No	0.0099	0.93	-9.90	0.92	-9.90	0.00	0.43
20	0.5086	No	0.0098	0.95	-9.90	0.94	-9.90	0.00	0.43
21	-0.4645	No	0.0106	0.85	-9.90	0.75	-9.90	0.00	0.51
22	0.1894	Yes	0.0099	0.96	-9.90	0.94	-9.90	-0.03	0.40
23	0.1619	No	0.0099	0.95	-9.90	0.92	-9.90	0.00	0.42
24	0.1941	Yes	0.0099	1.06	9.90	1.10	9.90	0.04	0.30
25	0.5645	No	0.0098	0.91	-9.90	0.89	-9.90	0.00	0.46
26	1.0977	No	0.0100	1.10	9.90	1.15	9.90	0.00	0.26
27	0.0584	No	0.0100	1.13	9.90	1.21	9.90	0.00	0.21
28	0.1100	Yes	0.0099	0.87	-9.90	0.83	-9.90	-0.16	0.47
29	0.4146	Yes	0.0098	1.06	9.90	1.07	9.90	-0.07	0.31
30	-0.1019	Yes	0.0101	0.95	-9.90	0.90	-9.90	-0.09	0.39
31	1.5906	No	0.0106	1.13	9.90	1.23	9.90	0.00	0.22
32	0.3912	No	0.0098	1.13	9.90	1.15	9.90	0.00	0.23
33	0.2464	No	0.0099	1.08	9.90	1.14	9.90	0.00	0.28
34	-0.1708	Yes	0.0102	0.96	-9.01	0.95	-7.31	-0.03	0.38
35	0.5958	No	0.0098	1.08	9.90	1.13	9.90	0.00	0.29
36	-0.3088	No	0.0104	0.97	-6.24	0.97	-3.29	0.00	0.37
37	0.5107	No	0.0098	0.92	-9.90	0.91	-9.90	0.00	0.45
38	-0.0027	No	0.0100	0.86	-9.90	0.80	-9.90	0.00	0.51
39	-0.1225	No	0.0101	0.97	-7.48	0.96	-5.86	0.00	0.38
40	0.4700	Yes	0.0098	1.01	1.63	1.02	3.96	-0.03	0.36
41	0.3512	Yes	0.0098	0.94	-9.90	0.91	-9.90	0.01	0.43
42	0.2103	No	0.0099	1.04	9.90	1.03	5.08	0.00	0.32
43	0.7202	No	0.0098	1.11	9.90	1.14	9.90	0.00	0.26
44	0.4730	No	0.0098	1.06	9.90	1.05	9.90	0.00	0.31
45	0.0383	No	0.0100	1.03	7.69	1.05	8.19	0.00	0.32
46	1.0319	No	0.0100	1.08	9.90	1.13	9.90	0.00	0.28
47	0.2011	No	0.0099	1.02	6.47	1.01	0.93	0.00	0.34
48	-0.4601	No	0.0106	0.81	-9.90	0.70	-9.90	0.00	0.55
49	0.9617	Yes	0.0054	0.88	-9.90	0.87	-9.90	0.13	0.61
50	0.6249	No	0.0052	1.16	9.90	1.19	9.90	0.00	0.50

¹ Item indicates the order in which items were entered in Winsteps

APPENDIX H

RAW SCORE TO SCALE SCORE CONVERSION TABLES

Language Arts Literacy

Table H.1: LAL Grade 3

LAL Grade 3 2011 Operational							
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-6.486	1.842	26	202	0.259	0.400
1	100	-5.240	1.030	27	206	0.422	0.406
2	100	-4.487	0.749	28	209	0.589	0.413
3	109	-4.020	0.629	29	213	0.764	0.422
4	117	-3.670	0.560	30	217	0.947	0.433
5	123	-3.383	0.515	31	221	1.140	0.446
6	129	-3.133	0.485	32	226	1.345	0.461
7	133	-2.909	0.464	33	230	1.566	0.478
8	138	-2.701	0.449	34	235	1.803	0.497
9	142	-2.505	0.438	35	241	2.060	0.517
10	146	-2.317	0.430	36	250	2.337	0.537
11	150	-2.135	0.423	37	253	2.636	0.556
12	154	-1.958	0.418	38	260	2.956	0.575
13	158	-1.785	0.414	39	268	3.297	0.592
14	161	-1.616	0.409	40	276	3.657	0.609
15	165	-1.450	0.405	41	284	4.040	0.628
16	169	-1.287	0.401	42	293	4.448	0.650
17	172	-1.128	0.398	43	300	4.889	0.679
18	175	-0.970	0.395	44	300	5.378	0.722
19	179	-0.816	0.392	45	300	5.948	0.793
20	182	-0.662	0.390	46	300	6.671	0.918
21	185	-0.510	0.389	47	300	7.686	1.092
22	189	-0.359	0.389	48	300	8.983	1.162
23	192	-0.207	0.390	49	300	10.407	1.268
24	195	-0.054	0.392	50	300	11.985	1.950
25	200	0.101	0.396				

Table H.2: LAL Grade 3: Braille

LAL Grade 3 2011 Operational				LAL Grade 3 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-6.573	1.853	26	208	0.546	0.448
1	100	-5.301	1.048	27	213	0.753	0.463
2	100	-4.511	0.772	28	218	0.976	0.481
3	110	-4.010	0.654	29	223	1.217	0.501
4	118	-3.628	0.586	30	228	1.479	0.522
5	125	-3.312	0.541	31	235	1.762	0.542
6	131	-3.037	0.509	32	241	2.067	0.561
7	136	-2.791	0.484	33	250	2.389	0.575
8	141	-2.566	0.465	34	255	2.727	0.587
9	145	-2.358	0.449	35	263	3.078	0.597
10	150	-2.162	0.437	36	271	3.441	0.609
11	154	-1.976	0.426	37	279	3.821	0.623
12	157	-1.798	0.418	38	288	4.219	0.638
13	161	-1.627	0.411	39	297	4.634	0.650
14	165	-1.460	0.405	40	300	5.060	0.653
15	168	-1.298	0.401	41	300	5.483	0.647
16	172	-1.138	0.398	42	300	5.894	0.634
17	175	-0.980	0.397	43	300	6.289	0.623
18	179	-0.823	0.397	44	300	6.673	0.618
19	182	-0.665	0.398	45	300	7.059	0.626
20	185	-0.506	0.400	46	300	7.464	0.651
21	189	-0.345	0.404	47	300	7.918	0.702
22	192	-0.180	0.409	48	300	8.477	0.805
23	196	-0.010	0.416	49	300	9.315	1.068
24	200	0.166	0.424	50	300	10.615	1.862
25	204	0.351	0.435				

Table H.3: LAL Grade 3: Alternate

LAL Grade 3 2011 Operational				LAL Grade 3 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-6.966	1.854	26	200	0.159	0.400
1	100	-5.690	1.051	27	203	0.321	0.406
2	100	-4.891	0.779	28	207	0.489	0.413
3	102	-4.377	0.665	29	211	0.663	0.423
4	110	-3.980	0.600	30	215	0.846	0.433
5	117	-3.648	0.556	31	219	1.040	0.446
6	124	-3.356	0.525	32	223	1.245	0.460
7	129	-3.094	0.500	33	228	1.463	0.475
8	135	-2.854	0.480	34	233	1.697	0.492
9	139	-2.631	0.464	35	239	1.947	0.509
10	144	-2.423	0.450	36	244	2.214	0.524
11	148	-2.226	0.437	37	250	2.497	0.539
12	152	-2.040	0.427	38	257	2.794	0.552
13	156	-1.862	0.418	39	264	3.106	0.564
14	160	-1.690	0.410	40	271	3.432	0.578
15	163	-1.525	0.403	41	278	3.774	0.593
16	167	-1.365	0.398	42	286	4.137	0.612
17	170	-1.208	0.394	43	294	4.524	0.633
18	174	-1.054	0.390	44	300	4.942	0.661
19	177	-0.903	0.388	45	300	5.402	0.697
20	180	-0.753	0.387	46	300	5.921	0.747
21	183	-0.604	0.386	47	300	6.530	0.818
22	187	-0.454	0.387	48	300	7.283	0.927
23	190	-0.304	0.388	49	300	8.338	1.166
24	193	-0.152	0.391	50	300	9.790	1.918
25	196	0.002	0.395				

Table H.4: LAL Grade 4

LAL Grade 4 2011 Operational				LAL Grade 4 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-6.651	1.833	29	188	-0.191	0.348
1	100	-5.427	1.015	30	191	-0.068	0.351
2	100	-4.701	0.732	31	194	0.056	0.354
3	100	-4.257	0.611	32	200	0.182	0.358
4	100	-3.927	0.543	33	201	0.312	0.362
5	100	-3.657	0.499	34	205	0.445	0.367
6	103	-3.423	0.469	35	208	0.582	0.373
7	108	-3.214	0.447	36	212	0.724	0.380
8	113	-3.022	0.430	37	216	0.871	0.389
9	118	-2.843	0.417	38	220	1.026	0.398
10	122	-2.674	0.406	39	224	1.189	0.409
11	127	-2.513	0.398	40	229	1.361	0.421
12	131	-2.358	0.390	41	234	1.544	0.435
13	135	-2.208	0.383	42	239	1.740	0.452
14	139	-2.064	0.377	43	245	1.953	0.471
15	142	-1.923	0.372	44	250	2.185	0.492
16	146	-1.787	0.367	45	257	2.439	0.517
17	149	-1.654	0.362	46	265	2.720	0.544
18	153	-1.524	0.359	47	273	3.033	0.574
19	156	-1.397	0.355	48	282	3.381	0.607
20	159	-1.272	0.352	49	293	3.772	0.644
21	163	-1.149	0.349	50	300	4.218	0.695
22	166	-1.027	0.348	51	300	4.752	0.773
23	169	-0.907	0.346	52	300	5.451	0.908
24	172	-0.788	0.345	53	300	6.442	1.071
25	175	-0.669	0.345	54	300	7.632	1.093
26	178	-0.550	0.345	55	300	8.911	1.222
27	182	-0.431	0.345	56	300	10.426	1.932
28	185	-0.311	0.347				

Table H.6: LAL Grade 4

LAL Grade 4 2011 Operational							
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-6.651	1.833	29	188	-0.191	0.348
1	100	-5.427	1.015	30	191	-0.068	0.351
2	100	-4.701	0.732	31	194	0.056	0.354
3	100	-4.257	0.611	32	200	0.182	0.358
4	100	-3.927	0.543	33	201	0.312	0.362
5	100	-3.657	0.499	34	205	0.445	0.367
6	103	-3.423	0.469	35	208	0.582	0.373
7	108	-3.214	0.447	36	212	0.724	0.380
8	113	-3.022	0.430	37	216	0.871	0.389
9	118	-2.843	0.417	38	220	1.026	0.398
10	122	-2.674	0.406	39	224	1.189	0.409
11	127	-2.513	0.398	40	229	1.361	0.421
12	131	-2.358	0.390	41	234	1.544	0.435
13	135	-2.208	0.383	42	239	1.740	0.452
14	139	-2.064	0.377	43	245	1.953	0.471
15	142	-1.923	0.372	44	250	2.185	0.492
16	146	-1.787	0.367	45	257	2.439	0.517
17	149	-1.654	0.362	46	265	2.720	0.544
18	153	-1.524	0.359	47	273	3.033	0.574
19	156	-1.397	0.355	48	282	3.381	0.607
20	159	-1.272	0.352	49	293	3.772	0.644
21	163	-1.149	0.349	50	300	4.218	0.695
22	166	-1.027	0.348	51	300	4.752	0.773
23	169	-0.907	0.346	52	300	5.451	0.908
24	172	-0.788	0.345	53	300	6.442	1.071
25	175	-0.669	0.345	54	300	7.632	1.093
26	178	-0.550	0.345	55	300	8.911	1.222
27	182	-0.431	0.345	56	300	10.426	1.932
28	185	-0.311	0.347				

Table H.5: LAL Grade 4: Braille

LAL Grade 4 2011 Operational				LAL Grade 4 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-7.167	1.848	29	186	-0.260	0.360
1	100	-5.906	1.040	30	190	-0.129	0.364
2	100	-5.132	0.763	31	193	0.005	0.368
3	100	-4.644	0.644	32	197	0.142	0.374
4	100	-4.275	0.576	33	200	0.284	0.380
5	100	-3.970	0.531	34	204	0.431	0.387
6	100	-3.707	0.498	35	208	0.584	0.396
7	101	-3.471	0.473	36	213	0.745	0.406
8	107	-3.257	0.453	37	217	0.914	0.417
9	112	-3.059	0.437	38	222	1.093	0.430
10	117	-2.874	0.424	39	227	1.283	0.444
11	122	-2.699	0.412	40	232	1.487	0.459
12	126	-2.533	0.403	41	238	1.706	0.476
13	130	-2.375	0.394	42	244	1.941	0.494
14	134	-2.222	0.387	43	250	2.194	0.513
15	138	-2.075	0.380	44	258	2.468	0.533
16	142	-1.933	0.375	45	266	2.763	0.554
17	146	-1.794	0.370	46	274	3.082	0.576
18	149	-1.659	0.366	47	284	3.429	0.602
19	153	-1.527	0.362	48	294	3.810	0.634
20	156	-1.397	0.359	49	300	4.236	0.673
21	160	-1.269	0.357	50	300	4.721	0.722
22	163	-1.142	0.355	51	300	5.286	0.783
23	166	-1.017	0.354	52	300	5.959	0.860
24	169	-0.892	0.353	53	300	6.771	0.938
25	173	-0.767	0.353	54	300	7.709	1.001
26	176	-0.642	0.354	55	300	8.858	1.187
27	179	-0.516	0.355	56	300	10.328	1.920
28	183	-0.389	0.357				

Table H.6: LAL Grade 4: Alternate

LAL Grade 4 2011 Operational				LAL Grade 4 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-7.042	1.843	29	184	-0.345	0.360
1	100	-5.796	1.028	30	187	-0.214	0.363
2	100	-5.048	0.744	31	191	-0.081	0.367
3	100	-4.589	0.621	32	194	0.056	0.373
4	100	-4.249	0.551	33	200	0.197	0.379
5	100	-3.972	0.505	34	202	0.343	0.386
6	100	-3.733	0.474	35	206	0.495	0.395
7	100	-3.519	0.452	36	210	0.655	0.405
8	105	-3.322	0.436	37	215	0.823	0.416
9	110	-3.137	0.424	38	219	1.002	0.430
10	115	-2.962	0.414	39	225	1.193	0.445
11	119	-2.794	0.406	40	230	1.400	0.463
12	124	-2.632	0.399	41	236	1.624	0.484
13	128	-2.475	0.393	42	242	1.869	0.507
14	132	-2.323	0.387	43	250	2.139	0.532
15	136	-2.175	0.382	44	257	2.436	0.558
16	139	-2.031	0.377	45	266	2.762	0.584
17	143	-1.891	0.372	46	275	3.118	0.608
18	147	-1.754	0.368	47	285	3.502	0.631
19	150	-1.619	0.365	48	296	3.915	0.654
20	154	-1.488	0.361	49	300	4.359	0.681
21	157	-1.358	0.359	50	300	4.847	0.717
22	161	-1.230	0.357	51	300	5.397	0.770
23	164	-1.103	0.355	52	300	6.044	0.842
24	167	-0.978	0.354	53	300	6.823	0.920
25	171	-0.852	0.354	54	300	7.734	0.991
26	174	-0.727	0.355	55	300	8.869	1.184
27	177	-0.600	0.356	56	300	10.335	1.919
28	181	-0.473	0.357				

Table H.7: LAL Grade 5

LAL Grade 5 2011 Operational				LAL Grade 5 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.543	1.770	32	195	0.121	0.313
1	100	-4.453	0.932	33	200	0.219	0.315
2	100	-3.860	0.653	34	201	0.320	0.318
3	100	-3.510	0.542	35	204	0.422	0.321
4	100	-3.249	0.485	36	207	0.526	0.324
5	106	-3.031	0.450	37	210	0.632	0.328
6	111	-2.840	0.427	38	213	0.741	0.332
7	116	-2.664	0.410	39	216	0.853	0.337
8	121	-2.502	0.397	40	219	0.968	0.342
9	125	-2.349	0.385	41	223	1.086	0.347
10	129	-2.205	0.374	42	226	1.209	0.353
11	133	-2.068	0.365	43	230	1.336	0.360
12	137	-1.938	0.356	44	234	1.469	0.368
13	140	-1.814	0.349	45	238	1.607	0.377
14	144	-1.695	0.342	46	242	1.753	0.387
15	147	-1.580	0.337	47	246	1.907	0.398
16	150	-1.468	0.332	48	250	2.071	0.412
17	153	-1.359	0.328	49	256	2.246	0.426
18	156	-1.253	0.325	50	261	2.434	0.442
19	159	-1.148	0.322	51	267	2.636	0.457
20	162	-1.046	0.319	52	273	2.853	0.473
21	165	-0.945	0.317	53	280	3.085	0.490
22	168	-0.845	0.315	54	287	3.334	0.510
23	171	-0.747	0.313	55	294	3.607	0.536
24	174	-0.649	0.311	56	300	3.916	0.577
25	176	-0.553	0.310	57	300	4.289	0.653
26	179	-0.457	0.310	58	300	4.812	0.811
27	182	-0.361	0.309	59	300	5.729	1.121
28	184	-0.265	0.309	60	300	7.370	1.385
29	187	-0.170	0.310	61	300	9.260	1.388
30	190	-0.074	0.310	62	300	11.013	1.999
31	193	0.023	0.312				

Table H.8: LAL Grade 5: Braille

LAL Grade 5 2011 Operational				LAL Grade 5 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-6.038	1.826	32	186	-0.206	0.318
1	100	-4.837	0.996	33	189	-0.104	0.320
2	100	-4.155	0.698	34	192	0.000	0.323
3	100	-3.760	0.569	35	195	0.105	0.326
4	100	-3.480	0.495	36	200	0.212	0.330
5	100	-3.259	0.448	37	201	0.322	0.334
6	105	-3.073	0.415	38	204	0.435	0.339
7	109	-2.911	0.391	39	208	0.552	0.345
8	113	-2.765	0.374	40	211	0.674	0.353
9	117	-2.630	0.360	41	215	0.801	0.361
10	121	-2.504	0.350	42	219	0.935	0.370
11	124	-2.384	0.343	43	223	1.076	0.381
12	128	-2.269	0.337	44	227	1.226	0.393
13	131	-2.157	0.333	45	231	1.385	0.405
14	134	-2.047	0.330	46	236	1.555	0.418
15	137	-1.939	0.328	47	241	1.735	0.431
16	140	-1.832	0.326	48	250	1.927	0.445
17	143	-1.726	0.325	49	253	2.132	0.459
18	146	-1.621	0.324	50	259	2.351	0.477
19	149	-1.517	0.323	51	266	2.589	0.500
20	152	-1.413	0.322	52	273	2.853	0.530
21	155	-1.309	0.321	53	282	3.154	0.567
22	158	-1.207	0.320	54	291	3.496	0.602
23	161	-1.105	0.318	55	300	3.872	0.623
24	163	-1.004	0.317	56	300	4.274	0.647
25	166	-0.904	0.316	57	300	4.725	0.700
26	169	-0.804	0.316	58	300	5.267	0.771
27	172	-0.705	0.315	59	300	5.903	0.822
28	175	-0.605	0.315	60	300	6.638	0.905
29	178	-0.506	0.315	61	300	7.651	1.152
30	180	-0.406	0.316	62	300	9.088	1.916
31	183	-0.306	0.317				

Table H.9: LAL Grade 5: Alternate

LAL Grade 5 2011 Operational							
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.979	1.824	32	185	-0.253	0.312
1	100	-4.785	0.991	33	188	-0.155	0.314
2	100	-4.111	0.693	34	190	-0.056	0.316
3	100	-3.723	0.564	35	193	0.045	0.319
4	100	-3.447	0.491	36	196	0.148	0.323
5	100	-3.230	0.444	37	200	0.253	0.327
6	105	-3.047	0.412	38	202	0.361	0.331
7	110	-2.887	0.389	39	205	0.473	0.337
8	114	-2.743	0.371	40	209	0.588	0.343
9	118	-2.611	0.358	41	212	0.709	0.350
10	121	-2.486	0.348	42	216	0.834	0.359
11	125	-2.368	0.340	43	219	0.966	0.368
12	128	-2.255	0.334	44	223	1.106	0.379
13	131	-2.144	0.330	45	228	1.254	0.391
14	134	-2.037	0.326	46	232	1.412	0.404
15	137	-1.931	0.324	47	237	1.580	0.416
16	140	-1.827	0.322	48	242	1.759	0.429
17	143	-1.723	0.321	49	250	1.949	0.443
18	146	-1.621	0.319	50	253	2.152	0.458
19	149	-1.520	0.318	51	259	2.370	0.476
20	152	-1.419	0.317	52	266	2.607	0.499
21	155	-1.319	0.315	53	274	2.872	0.531
22	157	-1.220	0.314	54	282	3.174	0.569
23	160	-1.122	0.313	55	292	3.520	0.606
24	163	-1.024	0.312	56	300	3.903	0.631
25	166	-0.927	0.311	57	300	4.321	0.667
26	168	-0.831	0.310	58	300	4.818	0.752
27	171	-0.735	0.310	59	300	5.493	0.892
28	174	-0.639	0.309	60	300	6.402	1.007
29	177	-0.543	0.310	61	300	7.580	1.203
30	179	-0.447	0.310	62	300	9.078	1.930
31	182	-0.350	0.311				

Table H.10: LAL Grade 6

LAL Grade 6 2011 Operational				LAL Grade 6 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.672	1.820	36	194	0.206	0.293
1	100	-4.480	0.992	37	196	0.292	0.294
2	100	-3.800	0.700	38	198	0.379	0.296
3	100	-3.403	0.572	39	200	0.467	0.298
4	108	-3.120	0.497	40	203	0.557	0.301
5	113	-2.899	0.447	41	205	0.648	0.304
6	118	-2.715	0.411	42	208	0.741	0.307
7	122	-2.557	0.385	43	210	0.837	0.311
8	126	-2.417	0.365	44	213	0.934	0.315
9	129	-2.289	0.351	45	215	1.035	0.319
10	132	-2.170	0.339	46	218	1.139	0.325
11	135	-2.058	0.331	47	221	1.246	0.331
12	138	-1.950	0.325	48	224	1.358	0.338
13	141	-1.846	0.320	49	227	1.475	0.346
14	143	-1.745	0.317	50	230	1.598	0.355
15	146	-1.646	0.314	51	233	1.727	0.364
16	148	-1.548	0.311	52	237	1.862	0.373
17	151	-1.452	0.309	53	241	2.005	0.383
18	153	-1.357	0.307	54	244	2.155	0.391
19	156	-1.263	0.305	55	250	2.311	0.399
20	158	-1.170	0.303	56	253	2.473	0.405
21	161	-1.079	0.302	57	257	2.640	0.411
22	163	-0.989	0.300	58	261	2.810	0.416
23	165	-0.899	0.298	59	266	2.985	0.421
24	168	-0.811	0.296	60	271	3.166	0.428
25	170	-0.724	0.294	61	275	3.353	0.439
26	172	-0.638	0.293	62	281	3.553	0.455
27	174	-0.552	0.292	63	286	3.771	0.479
28	176	-0.468	0.291	64	293	4.016	0.514
29	179	-0.383	0.290	65	300	4.305	0.564
30	181	-0.300	0.289	66	300	4.663	0.635
31	183	-0.216	0.289	67	300	5.127	0.731
32	185	-0.132	0.289	68	300	5.761	0.870
33	187	-0.048	0.290	69	300	6.737	1.143
34	190	0.036	0.290	70	300	8.165	1.913
35	192	0.120	0.291				

Table H.11: LAL Grade 6: Braille

LAL Grade 6 2011 Operational				LAL Grade 6 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-6.068	1.847	36	198	0.349	0.312
1	100	-4.815	1.031	37	200	0.447	0.315
2	100	-4.068	0.739	38	203	0.548	0.319
3	100	-3.622	0.607	39	205	0.651	0.323
4	103	-3.302	0.529	40	208	0.757	0.328
5	110	-3.050	0.477	41	211	0.866	0.333
6	115	-2.840	0.440	42	214	0.979	0.339
7	120	-2.659	0.413	43	217	1.097	0.346
8	124	-2.497	0.392	44	220	1.219	0.354
9	128	-2.350	0.376	45	223	1.347	0.362
10	131	-2.214	0.363	46	227	1.481	0.371
11	135	-2.085	0.353	47	231	1.623	0.381
12	138	-1.964	0.345	48	234	1.772	0.393
13	141	-1.847	0.338	49	239	1.931	0.405
14	144	-1.735	0.332	50	243	2.100	0.418
15	146	-1.627	0.327	51	250	2.281	0.432
16	149	-1.522	0.322	52	253	2.473	0.445
17	152	-1.419	0.318	53	258	2.677	0.458
18	154	-1.319	0.315	54	264	2.892	0.468
19	157	-1.221	0.312	55	269	3.113	0.470
20	159	-1.125	0.309	56	275	3.331	0.462
21	162	-1.030	0.307	57	280	3.537	0.444
22	164	-0.937	0.305	58	285	3.725	0.425
23	167	-0.844	0.303	59	290	3.899	0.411
24	169	-0.753	0.302	60	294	4.066	0.408
25	171	-0.662	0.301	61	298	4.235	0.416
26	174	-0.572	0.300	62	300	4.415	0.432
27	176	-0.481	0.300	63	300	4.609	0.449
28	178	-0.391	0.300	64	300	4.818	0.463
29	181	-0.301	0.300	65	300	5.039	0.479
30	183	-0.211	0.301	66	300	5.283	0.512
31	185	-0.120	0.302	67	300	5.579	0.584
32	188	-0.029	0.303	68	300	6.006	0.739
33	190	0.064	0.305	69	300	6.803	1.085
34	193	0.158	0.307	70	300	8.170	1.901
35	195	0.252	0.309				

Table H.12: LAL Grade 6: Alternate

LAL Grade 6 2011 Operational				LAL Grade 6 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-6.068	1.847	36	198	0.349	0.312
1	100	-4.815	1.031	37	200	0.447	0.315
2	100	-4.068	0.739	38	203	0.548	0.319
3	100	-3.622	0.607	39	205	0.651	0.323
4	103	-3.302	0.529	40	208	0.757	0.328
5	110	-3.050	0.477	41	211	0.866	0.333
6	115	-2.840	0.440	42	214	0.979	0.339
7	120	-2.659	0.413	43	217	1.097	0.346
8	124	-2.497	0.392	44	220	1.219	0.354
9	128	-2.350	0.376	45	223	1.347	0.362
10	131	-2.214	0.363	46	227	1.481	0.371
11	135	-2.085	0.353	47	231	1.623	0.381
12	138	-1.964	0.345	48	234	1.772	0.393
13	141	-1.847	0.338	49	239	1.931	0.405
14	144	-1.735	0.332	50	243	2.100	0.418
15	146	-1.627	0.327	51	250	2.281	0.432
16	149	-1.522	0.322	52	253	2.473	0.445
17	152	-1.419	0.318	53	258	2.677	0.458
18	154	-1.319	0.315	54	264	2.892	0.468
19	157	-1.221	0.312	55	269	3.113	0.470
20	159	-1.125	0.309	56	275	3.331	0.462
21	162	-1.030	0.307	57	280	3.537	0.444
22	164	-0.937	0.305	58	285	3.725	0.425
23	167	-0.844	0.303	59	290	3.899	0.411
24	169	-0.753	0.302	60	294	4.066	0.408
25	171	-0.662	0.301	61	298	4.235	0.416
26	174	-0.572	0.300	62	300	4.415	0.432
27	176	-0.481	0.300	63	300	4.609	0.449
28	178	-0.391	0.300	64	300	4.818	0.463
29	181	-0.301	0.300	65	300	5.039	0.479
30	183	-0.211	0.301	66	300	5.283	0.512
31	185	-0.120	0.302	67	300	5.579	0.584
32	188	-0.029	0.303	68	300	6.006	0.739
33	190	0.064	0.305	69	300	6.803	1.085
34	193	0.158	0.307	70	300	8.170	1.901
35	195	0.252	0.309				

Table H.13: LAL Grade 6: Special Equating 1

LAL Grade 6 2011 Operational				Raw Sc.	Scale Sc.	Theta	S.E.
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.660	1.820	35	193	0.185	0.298
1	100	-4.469	0.992	36	196	0.275	0.300
2	100	-3.789	0.700	37	198	0.365	0.302
3	101	-3.392	0.572	38	200	0.457	0.305
4	108	-3.109	0.497	39	203	0.551	0.308
5	114	-2.887	0.447	40	205	0.647	0.311
6	119	-2.704	0.411	41	208	0.744	0.314
7	123	-2.546	0.385	42	210	0.845	0.319
8	126	-2.405	0.366	43	213	0.948	0.323
9	130	-2.276	0.351	44	216	1.054	0.329
10	133	-2.157	0.340	45	219	1.164	0.335
11	136	-2.044	0.332	46	222	1.278	0.342
12	138	-1.936	0.326	47	225	1.397	0.350
13	141	-1.831	0.322	48	228	1.523	0.358
14	144	-1.728	0.318	49	231	1.655	0.368
15	146	-1.628	0.316	50	235	1.794	0.378
16	149	-1.529	0.314	51	239	1.941	0.388
17	152	-1.431	0.312	52	243	2.095	0.398
18	154	-1.334	0.310	53	247	2.257	0.406
19	156	-1.239	0.308	54	251	2.424	0.412
20	159	-1.145	0.306	55	256	2.596	0.417
21	161	-1.051	0.304	56	260	2.772	0.422
22	164	-0.959	0.303	57	265	2.952	0.426
23	166	-0.868	0.301	58	270	3.136	0.433
24	168	-0.778	0.299	59	275	3.328	0.443
25	171	-0.689	0.298	60	280	3.530	0.458
26	173	-0.600	0.297	61	286	3.750	0.481
27	175	-0.513	0.296	62	292	3.998	0.516
28	178	-0.425	0.295	63	300	4.288	0.566
29	180	-0.339	0.294	64	309	4.648	0.636
30	182	-0.252	0.294	65	300	5.114	0.733
31	184	-0.165	0.294	66	300	5.752	0.872
32	187	-0.079	0.295	67	300	6.731	1.145
33	189	0.009	0.296	68	300	8.160	1.914
34	191	0.096	0.297				

Table H.14: LAL Grade 6: Special Equating 2

LAL Grade 6 2011 Operational				LAL Grade 6 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.527	1.818	31	194	0.215	0.322
1	100	-4.341	0.989	32	197	0.319	0.324
2	100	-3.666	0.696	33	200	0.425	0.327
3	104	-3.273	0.569	34	202	0.533	0.330
4	111	-2.993	0.495	35	205	0.644	0.334
5	117	-2.772	0.446	36	208	0.756	0.338
6	122	-2.589	0.412	37	211	0.872	0.342
7	126	-2.429	0.388	38	214	0.991	0.348
8	129	-2.285	0.371	39	217	1.114	0.354
9	133	-2.153	0.358	40	221	1.242	0.362
10	136	-2.028	0.349	41	224	1.376	0.370
11	139	-1.908	0.343	42	228	1.516	0.380
12	142	-1.792	0.339	43	232	1.665	0.390
13	145	-1.677	0.337	44	236	1.821	0.401
14	148	-1.565	0.335	45	240	1.986	0.411
15	151	-1.453	0.333	46	245	2.159	0.420
16	154	-1.343	0.332	47	250	2.338	0.426
17	157	-1.233	0.330	48	254	2.521	0.430
18	159	-1.125	0.329	49	259	2.708	0.433
19	162	-1.017	0.327	50	264	2.897	0.436
20	165	-0.911	0.325	51	269	3.089	0.441
21	168	-0.806	0.323	52	274	3.287	0.449
22	170	-0.702	0.322	53	279	3.494	0.463
23	173	-0.599	0.320	54	285	3.719	0.485
24	176	-0.497	0.319	55	291	3.969	0.518
25	178	-0.395	0.318	56	299	4.263	0.568
26	181	-0.294	0.318	57	300	4.625	0.639
27	184	-0.193	0.318	58	300	5.095	0.736
28	186	-0.092	0.318	59	300	5.738	0.875
29	189	0.009	0.319	60	300	6.722	1.147
30	191	0.112	0.320	61	300	8.154	1.915

Table H.15: LAL Grade 6: Spanish

LAL Grade 6 2011 Operational				LAL Grade 6 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.652	1.820	35	193	0.178	0.295
1	100	-4.461	0.992	36	195	0.265	0.297
2	100	-3.781	0.699	37	198	0.354	0.298
3	101	-3.384	0.571	38	200	0.444	0.300
4	108	-3.102	0.496	39	202	0.534	0.303
5	114	-2.881	0.447	40	205	0.627	0.305
6	119	-2.697	0.411	41	207	0.721	0.309
7	123	-2.539	0.385	42	210	0.817	0.312
8	126	-2.398	0.366	43	212	0.916	0.316
9	130	-2.270	0.351	44	215	1.018	0.321
10	133	-2.150	0.341	45	218	1.122	0.326
11	136	-2.037	0.333	46	220	1.231	0.332
12	139	-1.929	0.327	47	223	1.343	0.339
13	141	-1.824	0.322	48	226	1.461	0.347
14	144	-1.721	0.319	49	230	1.585	0.356
15	147	-1.620	0.316	50	233	1.714	0.365
16	149	-1.521	0.314	51	237	1.851	0.374
17	152	-1.423	0.312	52	240	1.995	0.384
18	154	-1.327	0.310	53	244	2.146	0.393
19	157	-1.231	0.308	54	250	2.303	0.400
20	159	-1.137	0.306	55	252	2.466	0.407
21	162	-1.044	0.304	56	257	2.633	0.412
22	164	-0.952	0.302	57	261	2.805	0.416
23	166	-0.862	0.300	58	266	2.980	0.422
24	169	-0.772	0.299	59	270	3.161	0.429
25	171	-0.683	0.297	60	275	3.350	0.440
26	173	-0.596	0.295	61	281	3.550	0.456
27	175	-0.509	0.294	62	286	3.768	0.479
28	178	-0.422	0.293	63	293	4.014	0.514
29	180	-0.337	0.293	64	300	4.303	0.564
30	182	-0.251	0.292	65	300	4.661	0.635
31	184	-0.166	0.292	66	300	5.125	0.732
32	187	-0.080	0.292	67	300	5.760	0.870
33	189	0.005	0.293	68	300	6.737	1.143
34	191	0.091	0.294	69	300	8.164	1.913

Table H.16: LAL Grade 7

LAL Grade 7 2011 Operational				LAL Grade 7 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-6.259	1.829	36	191	-0.219	0.292
1	100	-5.047	1.005	37	194	-0.134	0.293
2	100	-4.344	0.713	38	197	-0.047	0.294
3	100	-3.929	0.585	39	200	0.040	0.296
4	100	-3.632	0.511	40	203	0.128	0.298
5	100	-3.396	0.462	41	206	0.218	0.301
6	100	-3.198	0.428	42	209	0.310	0.304
7	100	-3.026	0.403	43	212	0.403	0.307
8	103	-2.871	0.384	44	215	0.499	0.311
9	108	-2.729	0.369	45	218	0.597	0.315
10	112	-2.597	0.357	46	221	0.697	0.320
11	117	-2.474	0.347	47	225	0.801	0.324
12	120	-2.357	0.338	48	228	0.908	0.329
13	124	-2.245	0.330	49	232	1.018	0.334
14	128	-2.138	0.324	50	236	1.131	0.339
15	131	-2.035	0.317	51	240	1.248	0.344
16	134	-1.936	0.312	52	244	1.368	0.349
17	138	-1.840	0.307	53	250	1.491	0.354
18	141	-1.747	0.303	54	252	1.618	0.359
19	144	-1.656	0.300	55	256	1.749	0.365
20	147	-1.567	0.297	56	261	1.885	0.372
21	149	-1.479	0.295	57	265	2.026	0.380
22	152	-1.393	0.293	58	270	2.173	0.389
23	155	-1.308	0.291	59	275	2.329	0.401
24	158	-1.223	0.290	60	281	2.496	0.416
25	161	-1.139	0.290	61	287	2.678	0.436
26	163	-1.056	0.289	62	294	2.879	0.462
27	166	-0.972	0.289	63	300	3.107	0.495
28	169	-0.889	0.288	64	300	3.373	0.538
29	172	-0.806	0.288	65	300	3.691	0.591
30	174	-0.723	0.289	66	300	4.081	0.658
31	177	-0.639	0.289	67	300	4.570	0.743
32	180	-0.556	0.289	68	300	5.209	0.864
33	183	-0.472	0.289	69	300	6.155	1.122
34	186	-0.388	0.290	70	300	7.539	1.894
35	188	-0.304	0.291				

Table H.17: LAL Grade 7: Braille

LAL Grade 7 2011 Operational				LAL Grade 7 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-6.428	1.841	36	203	0.150	0.309
1	100	-5.185	1.027	37	207	0.246	0.312
2	100	-4.439	0.743	38	210	0.344	0.315
3	100	-3.982	0.619	39	213	0.444	0.318
4	100	-3.646	0.546	40	216	0.547	0.322
5	100	-3.375	0.497	41	220	0.652	0.327
6	100	-3.146	0.461	42	224	0.761	0.332
7	101	-2.947	0.434	43	227	0.873	0.338
8	107	-2.768	0.412	44	231	0.989	0.344
9	112	-2.606	0.394	45	235	1.110	0.352
10	117	-2.457	0.379	46	239	1.236	0.360
11	122	-2.318	0.367	47	244	1.369	0.369
12	126	-2.187	0.356	48	250	1.510	0.380
13	130	-2.064	0.347	49	253	1.659	0.392
14	134	-1.946	0.339	50	259	1.818	0.406
15	138	-1.833	0.333	51	264	1.989	0.421
16	141	-1.724	0.327	52	270	2.173	0.437
17	145	-1.619	0.322	53	250	2.370	0.451
18	148	-1.517	0.317	54	284	2.578	0.460
19	152	-1.417	0.314	55	291	2.790	0.458
20	155	-1.320	0.311	56	297	2.994	0.442
21	158	-1.224	0.308	57	300	3.179	0.417
22	161	-1.130	0.306	58	300	3.343	0.394
23	164	-1.037	0.304	59	300	3.492	0.379
24	167	-0.946	0.302	60	300	3.633	0.374
25	170	-0.855	0.301	61	300	3.774	0.378
26	173	-0.764	0.300	62	300	3.922	0.391
27	176	-0.674	0.300	63	300	4.082	0.410
28	179	-0.584	0.300	64	300	4.260	0.435
29	182	-0.494	0.300	65	300	4.464	0.469
30	185	-0.404	0.300	66	300	4.705	0.516
31	188	-0.314	0.301	67	300	5.008	0.590
32	191	-0.223	0.302	68	300	5.429	0.718
33	194	-0.131	0.303	69	300	6.135	1.004
34	197	-0.039	0.305	70	300	7.340	1.823
35	200	0.055	0.307				

Table H.18: LAL Grade 7: Alternate

LAL Grade 7 2011 Operational				LAL Grade 7 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-6.428	1.841	36	203	0.150	0.309
1	100	-5.185	1.027	37	207	0.246	0.312
2	100	-4.439	0.743	38	210	0.344	0.315
3	100	-3.982	0.619	39	213	0.444	0.318
4	100	-3.646	0.546	40	216	0.547	0.322
5	100	-3.375	0.497	41	220	0.652	0.327
6	100	-3.146	0.461	42	224	0.761	0.332
7	101	-2.947	0.434	43	227	0.873	0.338
8	107	-2.768	0.412	44	231	0.989	0.344
9	112	-2.606	0.394	45	235	1.110	0.352
10	117	-2.457	0.379	46	239	1.236	0.360
11	122	-2.318	0.367	47	244	1.369	0.369
12	126	-2.187	0.356	48	250	1.510	0.380
13	130	-2.064	0.347	49	253	1.659	0.392
14	134	-1.946	0.339	50	259	1.818	0.406
15	138	-1.833	0.333	51	264	1.989	0.421
16	141	-1.724	0.327	52	270	2.173	0.437
17	145	-1.619	0.322	53	277	2.370	0.451
18	148	-1.517	0.317	54	284	2.578	0.460
19	152	-1.417	0.314	55	291	2.790	0.458
20	155	-1.320	0.311	56	297	2.994	0.442
21	158	-1.224	0.308	57	300	3.179	0.417
22	161	-1.130	0.306	58	300	3.343	0.394
23	164	-1.037	0.304	59	300	3.492	0.379
24	167	-0.946	0.302	60	300	3.633	0.374
25	170	-0.855	0.301	61	300	3.774	0.378
26	173	-0.764	0.300	62	300	3.922	0.391
27	176	-0.674	0.300	63	300	4.082	0.410
28	179	-0.584	0.300	64	300	4.260	0.435
29	182	-0.494	0.300	65	300	4.464	0.469
30	185	-0.404	0.300	66	300	4.705	0.516
31	188	-0.314	0.301	67	300	5.008	0.590
32	191	-0.223	0.302	68	300	5.429	0.718
33	194	-0.131	0.303	69	300	6.135	1.004
34	197	-0.039	0.305	70	300	7.340	1.823
35	200	0.055	0.307				

Table H.19: LAL Grade 8

LAL Grade 8 2011 Operational				LAL Grade 8 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.370	1.812	36	201	0.394	0.294
1	100	-4.197	0.980	37	203	0.481	0.295
2	113	-3.537	0.688	38	205	0.569	0.297
3	122	-3.154	0.561	39	207	0.657	0.299
4	128	-2.881	0.488	40	209	0.747	0.301
5	133	-2.667	0.440	41	211	0.839	0.304
6	137	-2.488	0.406	42	213	0.933	0.308
7	140	-2.334	0.381	43	215	1.029	0.312
8	143	-2.196	0.362	44	218	1.127	0.316
9	146	-2.071	0.347	45	220	1.229	0.322
10	149	-1.954	0.336	46	222	1.334	0.328
11	151	-1.844	0.327	47	225	1.444	0.334
12	153	-1.739	0.321	48	227	1.558	0.342
13	156	-1.638	0.315	49	230	1.678	0.350
14	158	-1.540	0.312	50	233	1.803	0.358
15	160	-1.444	0.308	51	236	1.934	0.367
16	162	-1.350	0.306	52	239	2.072	0.376
17	164	-1.257	0.304	53	242	2.217	0.385
18	166	-1.165	0.302	54	245	2.369	0.395
19	168	-1.074	0.300	55	250	2.529	0.405
20	170	-0.984	0.299	56	253	2.697	0.415
21	172	-0.895	0.298	57	257	2.874	0.427
22	174	-0.807	0.296	58	261	3.063	0.442
23	176	-0.720	0.295	59	265	3.265	0.458
24	178	-0.633	0.294	60	270	3.483	0.475
25	180	-0.546	0.294	61	275	3.717	0.492
26	182	-0.460	0.293	62	281	3.965	0.505
27	184	-0.375	0.292	63	287	4.227	0.518
28	186	-0.289	0.292	64	293	4.505	0.536
29	188	-0.204	0.292	65	300	4.808	0.568
30	190	-0.119	0.292	66	300	5.158	0.619
31	192	-0.034	0.292	67	300	5.588	0.698
32	193	0.051	0.292	68	300	6.160	0.823
33	195	0.136	0.292	69	300	7.040	1.093
34	197	0.222	0.293	70	300	8.382	1.879
35	200	0.308	0.293				

Table H.20: LAL Grade 8: Braille

LAL Grade 8 2011 Operational				LAL Grade 8 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.585	1.840	36	204	0.527	0.296
1	100	-4.347	1.022	37	206	0.615	0.297
2	112	-3.614	0.733	38	208	0.703	0.299
3	121	-3.174	0.604	39	210	0.793	0.301
4	129	-2.857	0.526	40	212	0.884	0.303
5	134	-2.609	0.472	41	214	0.977	0.306
6	139	-2.406	0.432	42	216	1.071	0.309
7	142	-2.233	0.401	43	218	1.168	0.314
8	146	-2.082	0.376	44	221	1.268	0.318
9	149	-1.949	0.356	45	223	1.371	0.324
10	152	-1.828	0.340	46	225	1.479	0.331
11	154	-1.716	0.329	47	228	1.590	0.338
12	156	-1.611	0.320	48	231	1.707	0.347
13	159	-1.511	0.313	49	233	1.831	0.356
14	161	-1.414	0.309	50	236	1.961	0.366
15	163	-1.320	0.306	51	239	2.100	0.377
16	165	-1.227	0.304	52	243	2.246	0.389
17	167	-1.135	0.303	53	246	2.402	0.401
18	169	-1.043	0.302	54	250	2.567	0.412
19	171	-0.953	0.301	55	254	2.742	0.423
20	173	-0.862	0.300	56	258	2.925	0.433
21	175	-0.772	0.299	57	262	3.117	0.444
22	177	-0.683	0.298	58	267	3.319	0.455
23	179	-0.595	0.297	59	271	3.532	0.468
24	181	-0.507	0.296	60	276	3.758	0.483
25	183	-0.420	0.295	61	282	3.999	0.497
26	185	-0.333	0.294	62	287	4.253	0.511
27	187	-0.247	0.293	63	293	4.522	0.528
28	189	-0.161	0.293	64	300	4.813	0.552
29	191	-0.075	0.293	65	300	5.138	0.591
30	193	0.011	0.292	66	300	5.519	0.646
31	195	0.096	0.293	67	300	5.984	0.721
32	196	0.182	0.293	68	300	6.580	0.832
33	198	0.267	0.293	69	300	7.463	1.089
34	200	0.354	0.294	70	300	8.795	1.874
35	202	0.440	0.295				

Table H.21: LAL Grade 8: Alternate

LAL Grade 8 2011 Operational				LAL Grade 8 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.585	1.840	36	204	0.527	0.296
1	100	-4.347	1.022	37	206	0.615	0.297
2	112	-3.614	0.733	38	208	0.703	0.299
3	121	-3.174	0.604	39	210	0.793	0.301
4	129	-2.857	0.526	40	212	0.884	0.303
5	134	-2.609	0.472	41	214	0.977	0.306
6	139	-2.406	0.432	42	216	1.071	0.309
7	142	-2.233	0.401	43	218	1.168	0.314
8	146	-2.082	0.376	44	221	1.268	0.318
9	149	-1.949	0.356	45	223	1.371	0.324
10	152	-1.828	0.340	46	225	1.479	0.331
11	154	-1.716	0.329	47	228	1.590	0.338
12	156	-1.611	0.320	48	231	1.707	0.347
13	159	-1.511	0.313	49	233	1.831	0.356
14	161	-1.414	0.309	50	236	1.961	0.366
15	163	-1.320	0.306	51	239	2.100	0.377
16	165	-1.227	0.304	52	243	2.246	0.389
17	167	-1.135	0.303	53	246	2.402	0.401
18	169	-1.043	0.302	54	250	2.567	0.412
19	171	-0.953	0.301	55	254	2.742	0.423
20	173	-0.862	0.300	56	258	2.925	0.433
21	175	-0.772	0.299	57	262	3.117	0.444
22	177	-0.683	0.298	58	267	3.319	0.455
23	179	-0.595	0.297	59	271	3.532	0.468
24	181	-0.507	0.296	60	276	3.758	0.483
25	183	-0.420	0.295	61	282	3.999	0.497
26	185	-0.333	0.294	62	287	4.253	0.511
27	187	-0.247	0.293	63	293	4.522	0.528
28	189	-0.161	0.293	64	300	4.813	0.552
29	191	-0.075	0.293	65	300	5.138	0.591
30	193	0.011	0.292	66	300	5.519	0.646
31	195	0.096	0.293	67	300	5.984	0.721
32	196	0.182	0.293	68	300	6.580	0.832
33	198	0.267	0.293	69	300	7.463	1.089
34	200	0.354	0.294	70	300	8.795	1.874
35	202	0.440	0.295				

Table H.22: LAL Grade 8: Special Equating 1

LAL Grade 8 2011 Operational							
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.238	1.807	31	200	0.375	0.325
1	101	-4.075	0.975	32	203	0.481	0.327
2	116	-3.423	0.683	33	205	0.588	0.329
3	124	-3.044	0.558	34	208	0.697	0.332
4	130	-2.774	0.487	35	210	0.809	0.335
5	135	-2.560	0.440	36	213	0.922	0.340
6	139	-2.381	0.408	37	216	1.040	0.345
7	143	-2.225	0.384	38	218	1.161	0.351
8	146	-2.085	0.367	39	221	1.287	0.359
9	149	-1.955	0.354	40	224	1.418	0.367
10	151	-1.834	0.344	41	227	1.556	0.376
11	154	-1.718	0.337	42	230	1.702	0.386
12	156	-1.605	0.333	43	234	1.854	0.396
13	159	-1.496	0.329	44	237	2.015	0.406
14	161	-1.389	0.327	45	241	2.184	0.416
15	164	-1.282	0.325	46	245	2.361	0.425
16	166	-1.177	0.324	47	250	2.546	0.435
17	168	-1.072	0.323	48	254	2.740	0.445
18	171	-0.968	0.322	49	258	2.943	0.458
19	173	-0.865	0.322	50	263	3.160	0.473
20	175	-0.762	0.321	51	268	3.391	0.490
21	178	-0.659	0.321	52	274	3.639	0.506
22	180	-0.556	0.320	53	280	3.901	0.518
23	182	-0.454	0.320	54	286	4.175	0.529
24	185	-0.351	0.320	55	292	4.463	0.544
25	187	-0.248	0.320	56	299	4.773	0.573
26	189	-0.146	0.321	57	300	5.129	0.623
27	191	-0.043	0.321	58	300	5.565	0.702
28	194	0.061	0.322	59	300	6.141	0.826
29	196	0.165	0.323	60	300	7.026	1.095
30	198	0.269	0.324	61	300	8.371	1.881

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Table H.23: Mathematics Grade 3

MATH Grade 3 2011 Operational							
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.115	1.837	26	206	0.350	0.287
1	100	-3.884	1.019	27	209	0.432	0.287
2	100	-3.152	0.734	28	212	0.514	0.287
3	100	-2.707	0.610	29	215	0.596	0.287
4	100	-2.381	0.537	30	219	0.679	0.289
5	110	-2.120	0.488	31	222	0.763	0.291
6	119	-1.899	0.452	32	225	0.849	0.294
7	126	-1.707	0.425	33	229	0.936	0.297
8	133	-1.536	0.404	34	232	1.025	0.302
9	139	-1.380	0.386	35	236	1.118	0.307
10	144	-1.237	0.371	36	239	1.214	0.313
11	149	-1.104	0.359	37	243	1.315	0.321
12	154	-0.979	0.348	38	250	1.421	0.330
13	159	-0.861	0.339	39	252	1.533	0.341
14	163	-0.749	0.331	40	256	1.654	0.354
15	167	-0.642	0.324	41	261	1.784	0.369
16	171	-0.539	0.318	42	267	1.927	0.388
17	175	-0.440	0.312	43	273	2.086	0.410
18	179	-0.344	0.307	44	280	2.266	0.439
19	183	-0.251	0.303	45	288	2.474	0.475
20	186	-0.161	0.299	46	298	2.723	0.526
21	189	-0.072	0.296	47	300	3.037	0.600
22	193	0.015	0.293	48	300	3.470	0.726
23	196	0.100	0.291	49	300	4.190	1.014
24	200	0.184	0.289	50	300	5.413	1.833
25	203	0.267	0.288				

Table H.24: Mathematics Grade 3: Braille

MATH Grade 3 2011 Operational				MATH Grade 3 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-4.945	1.835	24	206	0.349	0.300
1	100	-3.718	1.016	25	209	0.439	0.299
2	100	-2.992	0.730	26	213	0.528	0.300
3	100	-2.553	0.606	27	216	0.618	0.301
4	106	-2.232	0.533	28	220	0.709	0.303
5	116	-1.975	0.484	29	223	0.802	0.305
6	124	-1.758	0.449	30	227	0.896	0.309
7	131	-1.569	0.422	31	231	0.992	0.313
8	138	-1.400	0.401	32	235	1.092	0.319
9	144	-1.247	0.384	33	239	1.195	0.325
10	149	-1.105	0.369	34	243	1.304	0.334
11	155	-0.973	0.358	35	250	1.419	0.344
12	159	-0.849	0.348	36	252	1.541	0.356
13	164	-0.731	0.339	37	257	1.673	0.371
14	168	-0.618	0.332	38	263	1.818	0.389
15	172	-0.510	0.326	39	269	1.978	0.412
16	177	-0.405	0.320	40	276	2.158	0.440
17	180	-0.304	0.316	41	284	2.368	0.477
18	184	-0.206	0.312	42	294	2.618	0.527
19	188	-0.110	0.308	43	300	2.934	0.601
20	192	-0.015	0.306	44	300	3.367	0.727
21	195	0.077	0.303	45	300	4.090	1.015
22	200	0.169	0.302	46	300	5.315	1.834
23	202	0.259	0.300				

Table H.25: Mathematics Grade 3: Alternate

MATH Grade 3 2011 Operational				MATH Grade 3 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.021	1.834	26	205	0.333	0.282
1	100	-3.796	1.015	27	208	0.413	0.282
2	100	-3.072	0.729	28	211	0.492	0.282
3	100	-2.635	0.604	29	214	0.572	0.282
4	103	-2.316	0.531	30	218	0.652	0.284
5	112	-2.061	0.482	31	221	0.733	0.286
6	121	-1.846	0.446	32	224	0.815	0.288
7	128	-1.660	0.419	33	227	0.900	0.292
8	134	-1.494	0.397	34	230	0.986	0.296
9	140	-1.343	0.380	35	234	1.075	0.302
10	146	-1.204	0.365	36	238	1.168	0.308
11	151	-1.075	0.353	37	241	1.266	0.316
12	155	-0.954	0.343	38	245	1.368	0.325
13	160	-0.840	0.334	39	250	1.478	0.336
14	164	-0.732	0.326	40	254	1.595	0.349
15	168	-0.628	0.319	41	259	1.722	0.365
16	172	-0.528	0.313	42	264	1.862	0.384
17	176	-0.432	0.307	43	270	2.018	0.407
18	179	-0.339	0.303	44	277	2.194	0.435
19	183	-0.249	0.298	45	285	2.400	0.473
20	186	-0.161	0.295	46	295	2.647	0.524
21	189	-0.075	0.291	47	300	2.959	0.599
22	193	0.009	0.289	48	300	3.390	0.725
23	196	0.092	0.286	49	300	4.110	1.013
24	200	0.173	0.284	50	300	5.333	1.833
25	202	0.254	0.283				

Table H.26: Mathematics Grade 3: Large Print

MATH Grade 3 2011 Operational							
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.201	1.837	24	200	0.193	0.303
1	100	-3.968	1.021	25	203	0.285	0.303
2	100	-3.233	0.736	26	207	0.377	0.304
3	100	-2.786	0.612	27	210	0.470	0.305
4	100	-2.457	0.539	28	214	0.564	0.307
5	107	-2.194	0.491	29	218	0.659	0.310
6	116	-1.971	0.455	30	222	0.756	0.314
7	123	-1.776	0.428	31	225	0.856	0.318
8	130	-1.602	0.407	32	229	0.959	0.324
9	136	-1.444	0.389	33	234	1.066	0.331
10	142	-1.298	0.375	34	238	1.178	0.339
11	147	-1.162	0.363	35	242	1.296	0.348
12	152	-1.034	0.353	36	250	1.421	0.360
13	157	-0.913	0.344	37	253	1.556	0.375
14	161	-0.797	0.336	38	258	1.703	0.392
15	166	-0.686	0.330	39	265	1.865	0.414
16	170	-0.579	0.324	40	272	2.047	0.441
17	174	-0.476	0.319	41	280	2.257	0.477
18	178	-0.375	0.315	42	289	2.508	0.527
19	182	-0.277	0.312	43	300	2.823	0.601
20	185	-0.180	0.309	44	300	3.256	0.726
21	189	-0.086	0.307	45	300	3.977	1.014
22	193	0.008	0.305	46	300	5.200	1.833
23	196	0.101	0.304				

Table H.27: Mathematics Grade 4

MATH Grade 4 2011 Operational				MATH Grade 4 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.277	1.836	26	205	0.220	0.293
1	100	-4.047	1.019	27	208	0.306	0.293
2	100	-3.316	0.733	28	211	0.392	0.294
3	100	-2.873	0.609	29	215	0.478	0.295
4	103	-2.548	0.536	30	218	0.566	0.296
5	112	-2.287	0.488	31	221	0.654	0.298
6	120	-2.067	0.452	32	224	0.744	0.301
7	128	-1.875	0.425	33	228	0.836	0.305
8	134	-1.703	0.404	34	231	0.930	0.309
9	140	-1.547	0.387	35	235	1.026	0.314
10	145	-1.403	0.372	36	239	1.126	0.320
11	150	-1.269	0.360	37	242	1.231	0.327
12	155	-1.143	0.350	38	246	1.340	0.335
13	159	-1.024	0.341	39	250	1.455	0.345
14	163	-0.910	0.333	40	255	1.578	0.357
15	167	-0.802	0.326	41	260	1.710	0.371
16	171	-0.697	0.321	42	265	1.854	0.388
17	175	-0.596	0.315	43	271	2.013	0.410
18	178	-0.498	0.311	44	278	2.192	0.437
19	182	-0.403	0.307	45	286	2.399	0.474
20	185	-0.310	0.303	46	295	2.646	0.524
21	189	-0.218	0.301	47	300	2.958	0.598
22	192	-0.129	0.298	48	300	3.388	0.724
23	195	-0.040	0.296	49	300	4.106	1.012
24	200	0.047	0.295	50	300	5.327	1.833
25	202	0.133	0.294				

Table H.28: Mathematics Grade 4: Braille

MATH Grade 4 2011 Operational				MATH Grade 4 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.172	1.838	24	206	0.245	0.307
1	100	-3.938	1.021	25	209	0.340	0.308
2	100	-3.202	0.736	26	213	0.435	0.309
3	100	-2.755	0.613	27	217	0.531	0.310
4	107	-2.425	0.540	28	220	0.627	0.312
5	117	-2.160	0.491	29	224	0.726	0.315
6	125	-1.937	0.456	30	227	0.826	0.318
7	132	-1.742	0.429	31	231	0.928	0.323
8	139	-1.567	0.407	32	235	1.034	0.328
9	145	-1.408	0.390	33	239	1.143	0.334
10	150	-1.262	0.376	34	243	1.257	0.342
11	155	-1.125	0.364	35	250	1.377	0.351
12	160	-0.997	0.353	36	253	1.504	0.362
13	165	-0.875	0.345	37	258	1.640	0.375
14	169	-0.759	0.337	38	263	1.787	0.392
15	173	-0.647	0.331	39	269	1.949	0.413
16	177	-0.540	0.326	40	276	2.130	0.440
17	181	-0.435	0.321	41	283	2.339	0.476
18	185	-0.333	0.317	42	293	2.588	0.525
19	188	-0.234	0.314	43	300	2.902	0.599
20	192	-0.136	0.312	44	300	3.333	0.725
21	195	-0.039	0.310	45	300	4.051	1.013
22	200	0.056	0.308	46	300	5.273	1.833
23	202	0.151	0.308				

Table H.29: Mathematics Grade 4: Alternate

MATH Grade 4 2011 Operational				MATH Grade 4 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.193	1.837	26	206	0.256	0.289
1	100	-3.960	1.020	27	209	0.339	0.290
2	100	-3.227	0.735	28	213	0.423	0.291
3	100	-2.782	0.610	29	216	0.508	0.292
4	106	-2.455	0.537	30	219	0.594	0.294
5	116	-2.193	0.488	31	222	0.681	0.296
6	124	-1.973	0.452	32	225	0.770	0.300
7	131	-1.781	0.425	33	229	0.861	0.303
8	137	-1.611	0.402	34	232	0.954	0.308
9	143	-1.456	0.384	35	236	1.050	0.313
10	148	-1.314	0.369	36	239	1.150	0.319
11	153	-1.182	0.357	37	243	1.254	0.326
12	158	-1.059	0.346	38	250	1.363	0.335
13	162	-0.943	0.336	39	252	1.478	0.345
14	166	-0.833	0.328	40	256	1.601	0.356
15	170	-0.728	0.321	41	261	1.733	0.371
16	174	-0.627	0.315	42	266	1.877	0.388
17	177	-0.529	0.309	43	272	2.036	0.410
18	181	-0.435	0.305	44	279	2.215	0.437
19	184	-0.344	0.301	45	286	2.421	0.473
20	187	-0.254	0.297	46	296	2.668	0.523
21	191	-0.167	0.295	47	300	2.980	0.597
22	194	-0.081	0.292	48	300	3.409	0.724
23	197	0.004	0.291	49	300	4.125	1.012
24	200	0.088	0.290	50	300	5.346	1.832
25	203	0.172	0.289				

Table H.30: Mathematics Grade 5

MATH Grade 5 2011 Operational				MATH Grade 5 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.059	1.835	26	209	0.421	0.302
1	100	-3.831	1.017	27	212	0.513	0.303
2	100	-3.105	0.731	28	215	0.605	0.304
3	110	-2.665	0.606	29	218	0.698	0.306
4	120	-2.343	0.533	30	221	0.792	0.308
5	128	-2.086	0.484	31	224	0.888	0.311
6	135	-1.869	0.449	32	227	0.986	0.314
7	141	-1.679	0.422	33	230	1.086	0.318
8	147	-1.510	0.401	34	233	1.188	0.323
9	152	-1.357	0.383	35	237	1.294	0.328
10	156	-1.216	0.369	36	240	1.404	0.334
11	161	-1.084	0.357	37	244	1.518	0.341
12	164	-0.960	0.347	38	250	1.637	0.350
13	168	-0.842	0.339	39	252	1.763	0.360
14	172	-0.730	0.331	40	256	1.897	0.372
15	175	-0.622	0.325	41	261	2.040	0.386
16	179	-0.518	0.320	42	266	2.196	0.404
17	182	-0.418	0.315	43	271	2.368	0.426
18	185	-0.319	0.312	44	278	2.561	0.454
19	188	-0.223	0.309	45	285	2.784	0.491
20	191	-0.129	0.306	46	293	3.048	0.541
21	194	-0.035	0.304	47	300	3.380	0.616
22	197	0.057	0.303	48	300	3.833	0.742
23	200	0.148	0.302	49	300	4.579	1.028
24	203	0.239	0.302	50	300	5.824	1.843
25	206	0.330	0.302				

Table H.31: Mathematics Grade 5: Alternate

MATH Grade 5 2011 Operational							
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-4.928	1.835	24	208	0.383	0.304
1	100	-3.700	1.017	25	211	0.475	0.304
2	100	-2.973	0.731	26	214	0.568	0.305
3	114	-2.534	0.606	27	217	0.662	0.307
4	124	-2.212	0.533	28	220	0.756	0.309
5	133	-1.955	0.484	29	223	0.852	0.311
6	140	-1.738	0.449	30	226	0.950	0.315
7	146	-1.549	0.422	31	229	1.050	0.319
8	151	-1.380	0.401	32	232	1.153	0.324
9	156	-1.226	0.383	33	236	1.260	0.330
10	160	-1.085	0.369	34	239	1.371	0.337
11	165	-0.953	0.358	35	243	1.488	0.346
12	169	-0.829	0.348	36	250	1.611	0.356
13	173	-0.710	0.340	37	251	1.743	0.369
14	176	-0.598	0.332	38	256	1.884	0.384
15	180	-0.489	0.326	39	261	2.038	0.402
16	183	-0.384	0.321	40	266	2.209	0.425
17	186	-0.283	0.317	41	272	2.402	0.454
18	189	-0.183	0.313	42	280	2.624	0.491
19	193	-0.086	0.310	43	288	2.891	0.543
20	196	0.010	0.308	44	299	3.225	0.619
21	200	0.104	0.306	45	300	3.683	0.746
22	202	0.197	0.305	46	300	4.437	1.032
23	205	0.290	0.304	47	300	5.689	1.846

Table H.32: Mathematics Grade 6

MATH Grade 6 2011 Operational				MATH Grade 6 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.051	1.835	25	207	0.311	0.291
1	100	-3.823	1.017	26	209	0.396	0.291
2	100	-3.097	0.731	27	212	0.480	0.291
3	113	-2.657	0.606	28	215	0.565	0.292
4	123	-2.335	0.534	29	217	0.651	0.293
5	131	-2.077	0.485	30	220	0.737	0.295
6	138	-1.859	0.450	31	223	0.825	0.298
7	144	-1.670	0.423	32	226	0.915	0.301
8	150	-1.500	0.401	33	229	1.007	0.305
9	154	-1.346	0.384	34	232	1.102	0.310
10	159	-1.204	0.370	35	235	1.200	0.316
11	163	-1.072	0.358	36	238	1.302	0.323
12	167	-0.947	0.348	37	241	1.409	0.331
13	171	-0.830	0.339	38	245	1.522	0.341
14	174	-0.718	0.331	39	250	1.642	0.353
15	178	-0.610	0.324	40	253	1.772	0.368
16	181	-0.507	0.318	41	257	1.913	0.385
17	184	-0.407	0.313	42	262	2.070	0.407
18	187	-0.311	0.309	43	268	2.247	0.435
19	190	-0.217	0.305	44	274	2.452	0.472
20	193	-0.125	0.301	45	282	2.698	0.522
21	196	-0.035	0.298	46	292	3.008	0.597
22	200	0.053	0.296	47	300	3.437	0.724
23	201	0.140	0.294	48	300	4.154	1.012
24	204	0.226	0.292	49	300	5.376	1.833

Table H.33: Mathematics Grade 6: Braille

MATH Grade 6 2011 Operational				MATH Grade 6 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-4.986	1.836	22	203	0.190	0.315
1	100	-3.756	1.018	23	206	0.290	0.316
2	101	-3.026	0.733	24	209	0.390	0.318
3	115	-2.584	0.608	25	212	0.492	0.321
4	126	-2.260	0.536	26	216	0.596	0.325
5	134	-2.000	0.487	27	219	0.703	0.329
6	141	-1.781	0.451	28	223	0.813	0.335
7	147	-1.589	0.424	29	226	0.928	0.342
8	152	-1.419	0.403	30	230	1.048	0.351
9	157	-1.263	0.386	31	234	1.174	0.361
10	162	-1.120	0.371	32	238	1.309	0.373
11	166	-0.987	0.360	33	243	1.453	0.387
12	170	-0.861	0.350	34	250	1.609	0.404
13	174	-0.742	0.341	35	253	1.781	0.426
14	177	-0.628	0.334	36	259	1.973	0.453
15	181	-0.518	0.329	37	266	2.194	0.488
16	184	-0.412	0.324	38	274	2.455	0.537
17	187	-0.308	0.320	39	285	2.782	0.610
18	190	-0.206	0.317	40	299	3.225	0.734
19	194	-0.106	0.316	41	300	3.957	1.019
20	197	-0.007	0.314	42	300	5.188	1.836
21	200	0.092	0.314				

Table H.34: Mathematics Grade 6: Alternate

MATH Grade 6 2011 Operational							
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.193	1.834	25	200	0.107	0.294
1	100	-3.967	1.016	26	203	0.194	0.294
2	100	-3.242	0.729	27	206	0.281	0.296
3	108	-2.804	0.604	28	209	0.369	0.298
4	119	-2.485	0.531	29	211	0.458	0.300
5	127	-2.229	0.482	30	214	0.549	0.303
6	133	-2.015	0.446	31	217	0.642	0.307
7	139	-1.828	0.419	32	220	0.738	0.312
8	145	-1.662	0.397	33	223	0.837	0.317
9	149	-1.512	0.379	34	227	0.939	0.323
10	154	-1.374	0.365	35	230	1.046	0.331
11	158	-1.245	0.352	36	233	1.158	0.339
12	161	-1.125	0.342	37	237	1.276	0.349
13	165	-1.011	0.333	38	241	1.402	0.360
14	168	-0.903	0.325	39	245	1.536	0.374
15	172	-0.799	0.319	40	250	1.682	0.390
16	175	-0.699	0.313	41	255	1.841	0.409
17	178	-0.603	0.308	42	261	2.018	0.432
18	181	-0.509	0.304	43	267	2.217	0.462
19	184	-0.417	0.301	44	274	2.448	0.500
20	187	-0.327	0.298	45	283	2.723	0.552
21	189	-0.239	0.296	46	294	3.068	0.628
22	192	-0.152	0.295	47	300	3.538	0.755
23	195	-0.065	0.294	48	300	4.307	1.040
24	198	0.021	0.294	49	300	5.573	1.851

Table H.35: Mathematics Grade 6: Special Equating

MATH Grade 6 2011 Operational				MATH Grade 6 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.028	1.835	24	208	0.349	0.305
1	100	-3.800	1.017	25	211	0.442	0.305
2	100	-3.071	0.732	26	214	0.535	0.306
3	114	-2.630	0.608	27	217	0.629	0.307
4	124	-2.306	0.536	28	220	0.724	0.309
5	132	-2.045	0.487	29	223	0.820	0.311
6	139	-1.825	0.452	30	226	0.918	0.315
7	145	-1.633	0.426	31	229	1.018	0.319
8	151	-1.461	0.405	32	232	1.122	0.324
9	156	-1.304	0.388	33	236	1.229	0.331
10	160	-1.158	0.375	34	239	1.341	0.338
11	165	-1.022	0.363	35	243	1.458	0.348
12	169	-0.894	0.353	36	250	1.583	0.359
13	173	-0.772	0.345	37	251	1.716	0.373
14	176	-0.656	0.338	38	256	1.861	0.390
15	180	-0.543	0.332	39	261	2.021	0.411
16	183	-0.435	0.326	40	266	2.201	0.438
17	187	-0.330	0.322	41	273	2.409	0.475
18	190	-0.228	0.318	42	281	2.658	0.525
19	193	-0.128	0.314	43	291	2.971	0.599
20	196	-0.030	0.311	44	300	3.402	0.725
21	200	0.066	0.309	45	300	4.122	1.013
22	202	0.161	0.307	46	300	5.345	1.833
23	205	0.255	0.306				

Table H.36: Mathematics Grade 7

MATH Grade 7 2011 Operational				MATH Grade 7 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	-5.056	1.837	100	25	0.336	0.295	202
1	-3.825	1.019	100	26	0.423	0.295	205
2	-3.093	0.734	100	27	0.511	0.296	208
3	-2.649	0.609	100	28	0.599	0.297	211
4	-2.323	0.536	112	29	0.688	0.299	214
5	-2.062	0.487	121	30	0.777	0.301	217
6	-1.843	0.452	128	31	0.869	0.303	220
7	-1.651	0.424	134	32	0.962	0.307	223
8	-1.481	0.402	140	33	1.057	0.311	226
9	-1.326	0.385	145	34	1.155	0.315	229
10	-1.184	0.370	150	35	1.256	0.321	233
11	-1.051	0.358	155	36	1.361	0.327	236
12	-0.927	0.347	159	37	1.470	0.335	240
13	-0.810	0.338	163	38	1.586	0.345	244
14	-0.698	0.330	167	39	1.708	0.356	250
15	-0.591	0.324	170	40	1.840	0.370	253
16	-0.488	0.318	174	41	1.983	0.387	257
17	-0.389	0.313	177	42	2.141	0.409	263
18	-0.293	0.309	180	43	2.319	0.436	269
19	-0.199	0.305	184	44	2.525	0.473	276
20	-0.106	0.302	187	45	2.772	0.523	284
21	-0.016	0.300	190	46	3.083	0.597	295
22	0.073	0.298	193	47	3.512	0.724	300
23	0.161	0.296	196	48	4.229	1.012	300
24	0.249	0.296	200	49	5.451	1.833	300

Table H.37: Mathematics Grade 7: Braille

MATH Grade 7 2011 Operational				MATH Grade 7 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.230	1.836	24	195	0.122	0.303
1	100	-4.001	1.018	25	198	0.214	0.303
2	100	-3.272	0.732	26	200	0.306	0.304
3	100	-2.830	0.608	27	204	0.398	0.305
4	106	-2.505	0.536	28	207	0.492	0.307
5	114	-2.245	0.487	29	210	0.587	0.310
6	122	-2.025	0.452	30	214	0.684	0.314
7	128	-1.833	0.425	31	217	0.784	0.319
8	134	-1.661	0.404	32	220	0.887	0.324
9	139	-1.505	0.387	33	224	0.995	0.332
10	144	-1.360	0.373	34	228	1.108	0.340
11	149	-1.225	0.361	35	232	1.227	0.351
12	153	-1.099	0.351	36	236	1.354	0.363
13	157	-0.978	0.343	37	241	1.492	0.378
14	161	-0.863	0.335	38	250	1.641	0.396
15	165	-0.753	0.329	39	252	1.807	0.418
16	168	-0.647	0.323	40	258	1.993	0.446
17	172	-0.544	0.319	41	265	2.208	0.483
18	175	-0.443	0.315	42	274	2.465	0.532
19	179	-0.346	0.311	43	285	2.786	0.606
20	182	-0.250	0.308	44	300	3.226	0.731
21	185	-0.155	0.306	45	300	3.954	1.017
22	188	-0.062	0.305	46	300	5.182	1.835
23	191	0.030	0.303				

Table H.38: Mathematics Grade 7: Alternate

MATH Grade 7 2011 Operational				MATH Grade 7 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.234	1.836	25	197	0.182	0.297
1	100	-4.005	1.018	26	200	0.270	0.297
2	100	-3.276	0.732	27	202	0.358	0.297
3	100	-2.835	0.608	28	205	0.447	0.298
4	105	-2.510	0.535	29	209	0.536	0.299
5	114	-2.250	0.487	30	212	0.626	0.301
6	122	-2.031	0.452	31	215	0.717	0.303
7	128	-1.839	0.425	32	218	0.810	0.306
8	134	-1.668	0.404	33	221	0.904	0.310
9	139	-1.512	0.386	34	224	1.001	0.314
10	144	-1.369	0.372	35	228	1.102	0.319
11	149	-1.235	0.360	36	231	1.206	0.325
12	153	-1.108	0.350	37	235	1.314	0.333
13	157	-0.989	0.341	38	239	1.427	0.342
14	161	-0.875	0.334	39	243	1.548	0.352
15	164	-0.766	0.327	40	250	1.676	0.366
16	168	-0.660	0.322	41	252	1.816	0.382
17	171	-0.559	0.317	42	257	1.970	0.403
18	175	-0.460	0.312	43	263	2.143	0.431
19	178	-0.363	0.309	44	270	2.344	0.467
20	181	-0.269	0.306	45	278	2.585	0.518
21	184	-0.176	0.303	46	288	2.891	0.593
22	187	-0.085	0.301	47	300	3.316	0.721
23	191	0.005	0.299	48	300	4.030	1.011
24	194	0.094	0.298	49	300	5.250	1.832

Table H.39: Mathematics Grade 8

MATH Grade 8 2011 Operational				MATH Grade 8 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-4.849	1.836	25	212	0.685	0.308
1	100	-3.618	1.019	26	216	0.780	0.308
2	100	-2.886	0.734	27	219	0.875	0.309
3	100	-2.441	0.611	28	223	0.970	0.309
4	110	-2.114	0.538	29	226	1.066	0.310
5	120	-1.851	0.490	30	230	1.163	0.312
6	128	-1.628	0.455	31	233	1.261	0.314
7	135	-1.433	0.429	32	237	1.361	0.317
8	141	-1.258	0.408	33	240	1.462	0.321
9	147	-1.098	0.391	34	244	1.566	0.325
10	153	-0.950	0.378	35	250	1.673	0.330
11	158	-0.812	0.366	36	252	1.784	0.335
12	162	-0.682	0.356	37	256	1.899	0.342
13	167	-0.558	0.348	38	261	2.019	0.351
14	171	-0.439	0.341	39	265	2.145	0.361
15	175	-0.325	0.335	40	270	2.280	0.373
16	179	-0.214	0.330	41	276	2.425	0.389
17	183	-0.107	0.325	42	281	2.584	0.409
18	187	-0.002	0.322	43	288	2.761	0.434
19	191	0.100	0.318	44	295	2.964	0.468
20	194	0.201	0.316	45	300	3.205	0.516
21	200	0.300	0.313	46	300	3.507	0.588
22	202	0.397	0.311	47	300	3.922	0.713
23	205	0.494	0.310	48	300	4.620	1.001
24	209	0.589	0.309	49	300	5.823	1.825

Table H.40: Mathematics Grade 8: Braille

MATH Grade 8 2011 Operational				MATH Grade 8 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-4.979	1.840	23	205	0.498	0.317
1	100	-3.740	1.025	24	209	0.599	0.317
2	100	-2.996	0.742	25	213	0.699	0.317
3	100	-2.541	0.619	26	216	0.799	0.317
4	107	-2.204	0.547	27	220	0.901	0.319
5	117	-1.932	0.498	28	224	1.003	0.321
6	125	-1.702	0.463	29	228	1.106	0.323
7	133	-1.499	0.437	30	231	1.212	0.327
8	139	-1.318	0.416	31	235	1.320	0.331
9	145	-1.153	0.399	32	239	1.432	0.337
10	151	-1.000	0.384	33	244	1.548	0.344
11	156	-0.856	0.373	34	250	1.669	0.352
12	161	-0.721	0.363	35	253	1.797	0.363
13	166	-0.593	0.354	36	258	1.933	0.376
14	170	-0.470	0.347	37	263	2.080	0.392
15	174	-0.351	0.341	38	269	2.241	0.412
16	179	-0.237	0.336	39	275	2.422	0.439
17	183	-0.126	0.331	40	283	2.629	0.474
18	187	-0.017	0.327	41	292	2.876	0.523
19	190	0.089	0.324	42	300	3.187	0.597
20	194	0.193	0.322	43	300	3.615	0.723
21	200	0.296	0.320	44	300	4.330	1.011
22	202	0.397	0.318	45	300	5.550	1.832

Table H.41: Mathematics Grade 8: Alternate

MATH Grade 8 2011 Operational				MATH Grade 8 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.045	1.838	25	205	0.496	0.304
1	100	-3.808	1.023	26	209	0.588	0.303
2	100	-3.070	0.738	27	212	0.680	0.304
3	100	-2.619	0.615	28	215	0.772	0.304
4	104	-2.287	0.542	29	219	0.865	0.305
5	114	-2.020	0.494	30	222	0.959	0.307
6	122	-1.795	0.458	31	226	1.054	0.309
7	129	-1.597	0.431	32	229	1.150	0.312
8	135	-1.421	0.410	33	233	1.248	0.315
9	141	-1.260	0.392	34	236	1.349	0.320
10	147	-1.112	0.378	35	240	1.453	0.325
11	152	-0.974	0.366	36	244	1.561	0.331
12	156	-0.844	0.356	37	250	1.673	0.339
13	161	-0.721	0.347	38	252	1.791	0.348
14	165	-0.603	0.339	39	257	1.916	0.360
15	169	-0.490	0.333	40	262	2.050	0.373
16	173	-0.381	0.327	41	267	2.196	0.390
17	177	-0.276	0.322	42	273	2.356	0.411
18	181	-0.173	0.318	43	280	2.535	0.438
19	185	-0.073	0.315	44	287	2.742	0.474
20	188	0.025	0.312	45	296	2.989	0.523
21	192	0.121	0.309	46	300	3.301	0.597
22	195	0.216	0.307	47	300	3.730	0.723
23	200	0.310	0.306	48	300	4.446	1.012
24	202	0.403	0.304	49	300	5.667	1.832

Table H.42: Mathematics Grade 8: Spanish

MATH Grade 8 2011 Operational				MATH Grade 8 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-4.841	1.836	24	210	0.639	0.316
1	100	-3.609	1.020	25	214	0.738	0.316
2	100	-2.876	0.735	26	218	0.839	0.317
3	100	-2.431	0.611	27	221	0.940	0.319
4	111	-2.103	0.539	28	225	1.042	0.321
5	120	-1.838	0.491	29	229	1.146	0.324
6	128	-1.615	0.456	30	233	1.252	0.328
7	135	-1.419	0.430	31	237	1.361	0.333
8	142	-1.243	0.409	32	241	1.473	0.338
9	148	-1.082	0.393	33	245	1.590	0.345
10	153	-0.933	0.379	34	250	1.712	0.353
11	158	-0.794	0.368	35	254	1.840	0.363
12	163	-0.662	0.358	36	259	1.976	0.375
13	168	-0.536	0.350	37	265	2.122	0.388
14	172	-0.416	0.344	38	270	2.278	0.404
15	176	-0.300	0.338	39	276	2.450	0.424
16	180	-0.188	0.333	40	283	2.640	0.450
17	184	-0.078	0.329	41	291	2.857	0.483
18	188	0.028	0.325	42	300	3.112	0.529
19	192	0.133	0.322	43	300	3.427	0.599
20	196	0.236	0.320	44	300	3.855	0.721
21	200	0.338	0.318	45	300	4.565	1.006
22	203	0.439	0.317	46	300	5.776	1.828
23	207	0.539	0.316				

SCIENCE

Table H.43: Science Grade 4

SCIENCE Grade 4 2011 Operational				SCIENCE Grade 4 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-2.692	1.295	20	217	0.256	0.172
1	100	-1.727	0.510	21	222	0.315	0.172
2	100	-1.360	0.368	22	226	0.375	0.173
3	114	-1.136	0.306	23	231	0.435	0.175
4	127	-0.971	0.271	24	235	0.497	0.176
5	137	-0.838	0.247	25	240	0.560	0.179
6	145	-0.725	0.230	26	245	0.624	0.182
7	152	-0.625	0.217	27	250	0.692	0.185
8	159	-0.536	0.207	28	255	0.762	0.190
9	165	-0.453	0.199	29	260	0.836	0.196
10	171	-0.377	0.193	30	266	0.915	0.203
11	176	-0.304	0.188	31	273	1.001	0.212
12	181	-0.235	0.184	32	280	1.095	0.223
13	186	-0.169	0.180	33	287	1.201	0.237
14	191	-0.105	0.178	34	296	1.322	0.256
15	195	-0.043	0.175	35	300	1.466	0.282
16	200	0.018	0.174	36	300	1.647	0.321
17	204	0.078	0.173	37	300	1.891	0.384
18	209	0.137	0.172	38	300	2.286	0.526
19	213	0.197	0.172	39	300	3.282	1.302

Table H.44: Science Grade 4: Braille

SCIENCE Grade 4 2011 Operational							
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-2.660	1.295	19	220	0.290	0.180
1	100	-1.693	0.511	20	225	0.355	0.181
2	101	-1.324	0.369	21	230	0.421	0.182
3	117	-1.098	0.308	22	235	0.488	0.184
4	130	-0.931	0.273	23	240	0.557	0.187
5	140	-0.796	0.249	24	245	0.628	0.190
6	148	-0.680	0.232	25	250	0.701	0.194
7	156	-0.578	0.220	26	256	0.779	0.199
8	163	-0.486	0.210	27	262	0.861	0.206
9	169	-0.400	0.203	28	269	0.949	0.215
10	175	-0.321	0.197	29	276	1.046	0.226
11	180	-0.245	0.192	30	284	1.154	0.240
12	186	-0.173	0.188	31	293	1.278	0.259
13	191	-0.103	0.185	32	300	1.425	0.285
14	196	-0.035	0.183	33	300	1.609	0.323
15	200	0.031	0.181	34	300	1.857	0.387
16	206	0.096	0.180	35	300	2.257	0.528
17	210	0.161	0.180	36	300	3.258	1.304
18	215	0.226	0.180				

Table H.45: Science Grade 4: Alternate

SCIENCE Grade 4 2011 Operational				SCIENCE Grade 4 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-2.692	1.295	20	217	0.256	0.172
1	100	-1.727	0.510	21	222	0.315	0.172
2	100	-1.360	0.368	22	226	0.375	0.173
3	114	-1.136	0.306	23	231	0.435	0.175
4	127	-0.971	0.271	24	235	0.497	0.176
5	137	-0.838	0.247	25	240	0.560	0.179
6	145	-0.725	0.230	26	245	0.624	0.182
7	152	-0.625	0.217	27	250	0.692	0.185
8	159	-0.536	0.207	28	255	0.762	0.190
9	165	-0.453	0.199	29	260	0.836	0.196
10	171	-0.377	0.193	30	266	0.915	0.203
11	176	-0.304	0.188	31	273	1.001	0.212
12	181	-0.235	0.184	32	280	1.095	0.223
13	186	-0.169	0.180	33	287	1.201	0.237
14	191	-0.105	0.178	34	296	1.322	0.256
15	195	-0.043	0.175	35	300	1.466	0.282
16	200	0.018	0.174	36	300	1.647	0.321
17	204	0.078	0.173	37	300	1.891	0.384
18	209	0.137	0.172	38	300	2.286	0.526
19	213	0.197	0.172	39	300	3.282	1.302

Table H.46: Science Grade 8

SCIENCE Grade 8 2011 Operational				SCIENCE Grade 8 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.371	1.834	28	208	0.070	0.280
1	100	-4.146	1.014	29	210	0.148	0.280
2	100	-3.425	0.727	30	213	0.227	0.281
3	105	-2.990	0.602	31	215	0.306	0.282
4	116	-2.674	0.528	32	218	0.387	0.284
5	124	-2.422	0.478	33	221	0.468	0.287
6	131	-2.211	0.442	34	224	0.551	0.289
7	137	-2.027	0.415	35	226	0.636	0.293
8	143	-1.864	0.393	36	229	0.722	0.296
9	148	-1.717	0.375	37	232	0.811	0.301
10	152	-1.582	0.360	38	235	0.903	0.306
11	156	-1.457	0.348	39	239	0.999	0.312
12	160	-1.339	0.337	40	242	1.098	0.318
13	164	-1.228	0.328	41	245	1.202	0.326
14	168	-1.123	0.321	42	250	1.311	0.335
15	171	-1.023	0.314	43	253	1.427	0.346
16	174	-0.926	0.308	44	257	1.551	0.358
17	177	-0.833	0.302	45	262	1.684	0.373
18	180	-0.743	0.298	46	266	1.829	0.390
19	183	-0.656	0.294	47	272	1.990	0.412
20	186	-0.570	0.291	48	278	2.171	0.440
21	189	-0.487	0.288	49	285	2.380	0.476
22	192	-0.405	0.285	50	293	2.630	0.526
23	194	-0.324	0.283	51	300	2.943	0.599
24	197	-0.244	0.282	52	300	3.375	0.725
25	200	-0.165	0.281	53	300	4.094	1.013
26	202	-0.086	0.280	54	300	5.316	1.833
27	205	-0.008	0.280				

Table H.47: Science Grade 8: Braille

SCIENCE Grade 8 2011 Operational							
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.296	1.833	27	207	0.057	0.281
1	100	-4.073	1.014	28	210	0.136	0.282
2	100	-3.352	0.726	29	212	0.216	0.282
3	107	-2.919	0.601	30	215	0.296	0.284
4	118	-2.604	0.527	31	218	0.376	0.285
5	126	-2.353	0.477	32	221	0.458	0.287
6	133	-2.143	0.441	33	223	0.542	0.290
7	139	-1.960	0.414	34	226	0.627	0.293
8	145	-1.798	0.392	35	229	0.714	0.297
9	150	-1.652	0.374	36	232	0.803	0.301
10	154	-1.517	0.360	37	235	0.896	0.306
11	158	-1.392	0.347	38	238	0.991	0.312
12	162	-1.276	0.337	39	242	1.091	0.319
13	166	-1.165	0.328	40	245	1.195	0.327
14	170	-1.060	0.320	41	250	1.305	0.336
15	173	-0.960	0.313	42	253	1.421	0.346
16	176	-0.864	0.307	43	257	1.545	0.358
17	179	-0.771	0.302	44	261	1.679	0.373
18	182	-0.681	0.298	45	266	1.824	0.391
19	185	-0.594	0.294	46	272	1.985	0.413
20	188	-0.508	0.291	47	278	2.167	0.440
21	191	-0.425	0.288	48	285	2.376	0.476
22	194	-0.342	0.286	49	293	2.625	0.526
23	196	-0.261	0.284	50	300	2.939	0.600
24	200	-0.181	0.283	51	300	3.371	0.725
25	202	-0.101	0.282	52	300	4.090	1.013
26	204	-0.022	0.281	53	300	5.312	1.833

Table H.48: Science Grade 8: Alternate

SCIENCE Grade 8 2011 Operational				SCIENCE Grade 8 2011 Operational			
Raw Sc.	Scale Sc.	Theta	S.E.	Raw Sc.	Scale Sc.	Theta	S.E.
0	100	-5.371	1.834	28	208	0.070	0.280
1	100	-4.146	1.014	29	210	0.148	0.280
2	100	-3.425	0.727	30	213	0.227	0.281
3	105	-2.990	0.602	31	215	0.306	0.282
4	116	-2.674	0.528	32	218	0.387	0.284
5	124	-2.422	0.478	33	221	0.468	0.287
6	131	-2.211	0.442	34	224	0.551	0.289
7	137	-2.027	0.415	35	226	0.636	0.293
8	143	-1.864	0.393	36	229	0.722	0.296
9	148	-1.717	0.375	37	232	0.811	0.301
10	152	-1.582	0.360	38	235	0.903	0.306
11	156	-1.457	0.348	39	239	0.999	0.312
12	160	-1.339	0.337	40	242	1.098	0.318
13	164	-1.228	0.328	41	245	1.202	0.326
14	168	-1.123	0.321	42	250	1.311	0.335
15	171	-1.023	0.314	43	253	1.427	0.346
16	174	-0.926	0.308	44	257	1.551	0.358
17	177	-0.833	0.302	45	262	1.684	0.373
18	180	-0.743	0.298	46	266	1.829	0.390
19	183	-0.656	0.294	47	272	1.990	0.412
20	186	-0.570	0.291	48	278	2.171	0.440
21	189	-0.487	0.288	49	285	2.380	0.476
22	192	-0.405	0.285	50	293	2.630	0.526
23	194	-0.324	0.283	51	300	2.943	0.599
24	197	-0.244	0.282	52	300	3.375	0.725
25	200	-0.165	0.281	53	300	4.094	1.013
26	202	-0.086	0.280	54	300	5.316	1.833
27	205	-0.008	0.280				

APPENDIX I

ITEM MAPS

PERSONS MAP OF ITEMS

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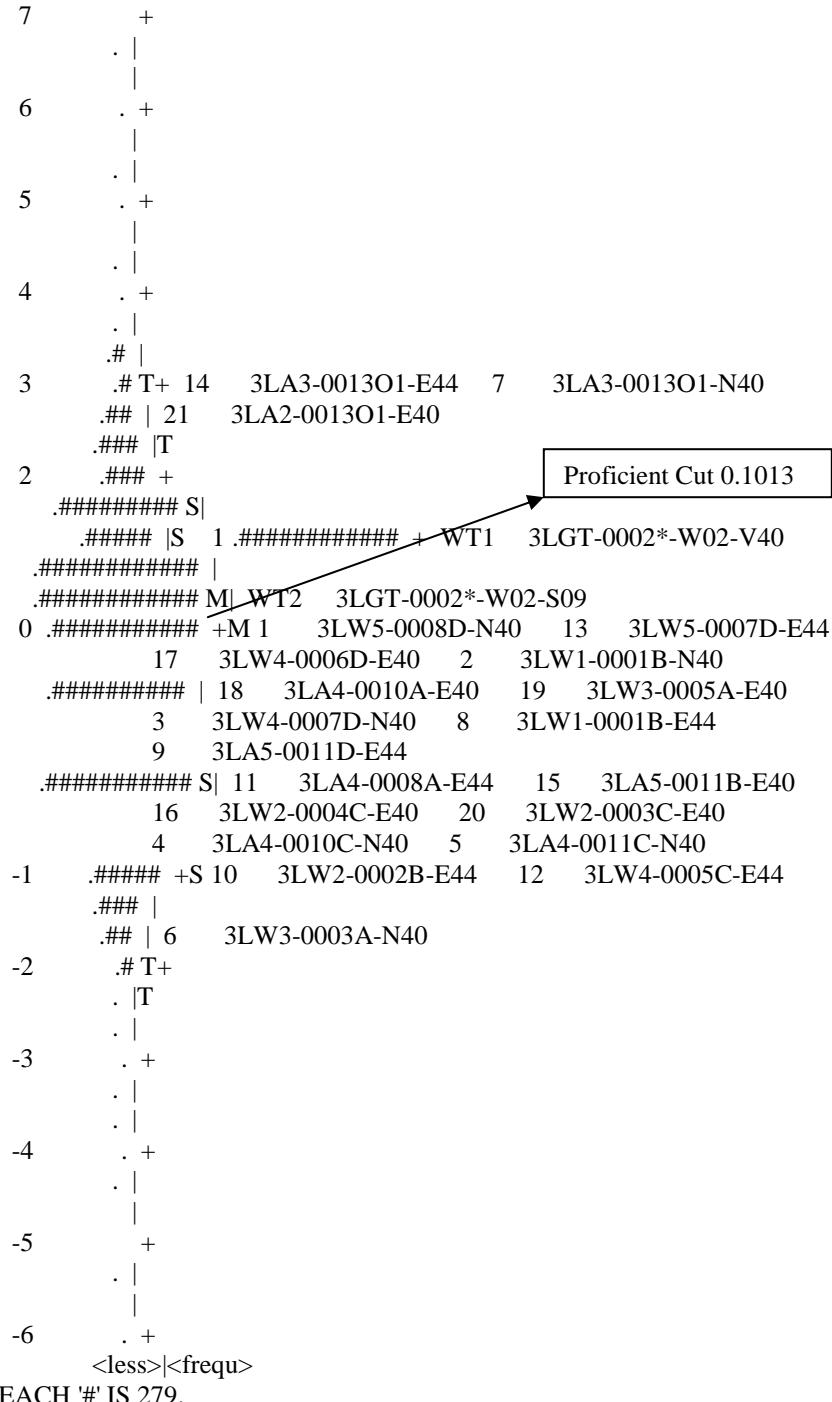


Figure I.1: Item Map LAL Grade 3

PERSONS MAP OF ITEMS

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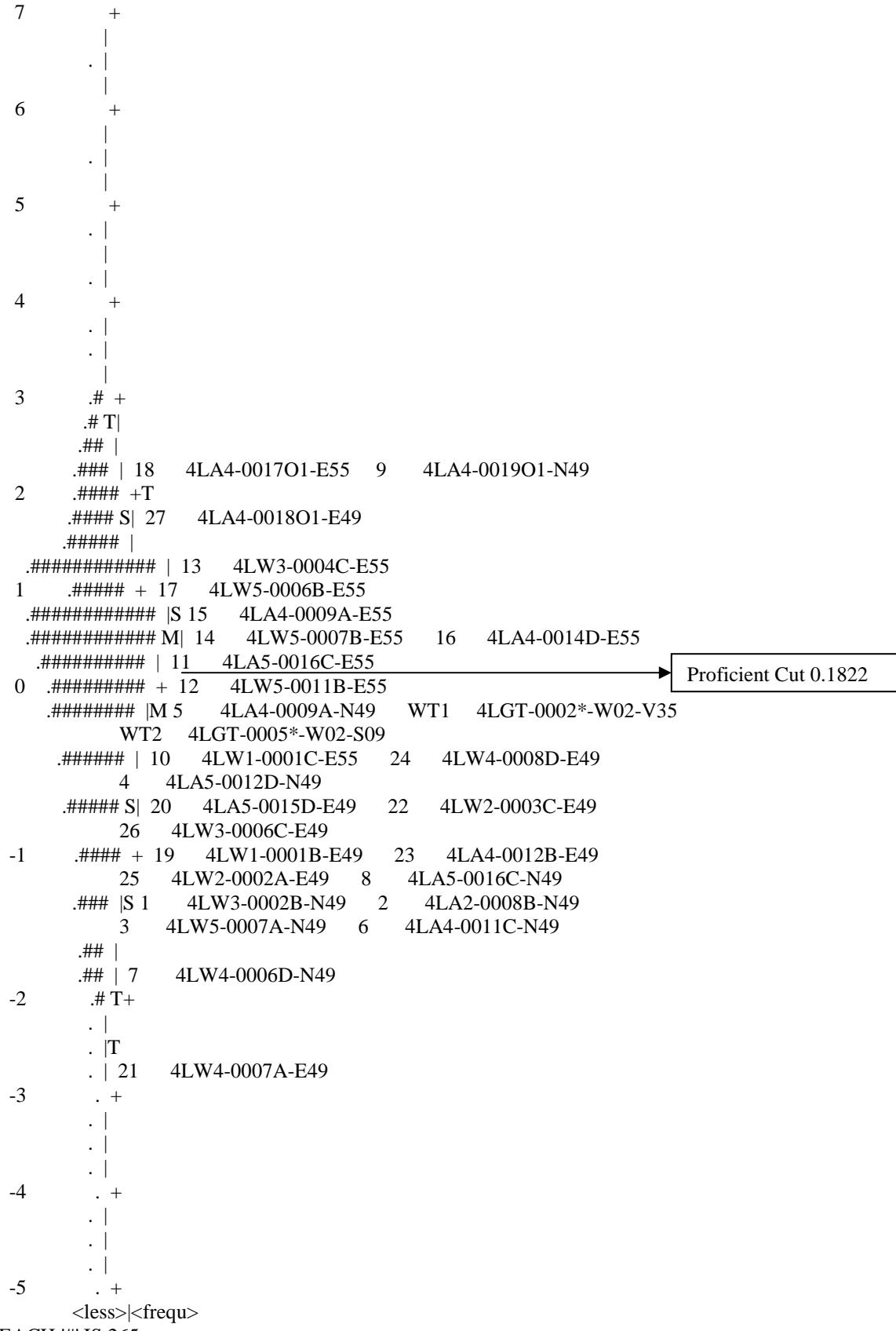


Figure I.2: Item Map LAL Grade 4

PERSONS MAP OF ITEMS

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.##### 24 5LW4-0005C-E50	
.##### M 16 5LW3-0006C-E51	
.##### 28 5LW2-0002B-E50 30 5LA4-0015A-E50	
31 5LA4-0013B-E50 32 5LW5-0009C-E50	
WT2 5LGT-0002*-W02-V57	
0 .##### +M 12 5LW1-0001C-E51 13 5LW2-0003A-E51	
15 5LW3-0004C-E51 17 5LA2-0012D-E51	
18 5LA2-0013D-E51 19 5LA5-0020B-E51	
29 5LA4-0011A-E50	
.##### 14 5LA5-0019B-E51 2 5LW5-0010D-N51	
20 5LA4-0015A-E51 21 5LA4-0016A-E51	
27 5LW4-0006C-E50 4 5LW4-0007C-N51	
WT1 5LGT-0008*-W01-S09	
.##### S 1 5LW1-0001B-N51 25 5LA5-0018D-E50	
3 5LA5-0020B-N51 5 5LA5-0019B-N51	
9 5LW2-0003C-N51	
.#####	
-1 .### +S 26 5LW3-0004D-E50 6 5LA2-0013A-N51	
7 5LW5-0011D-N51	
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Figure I.3: Item Map LAL Grade 5

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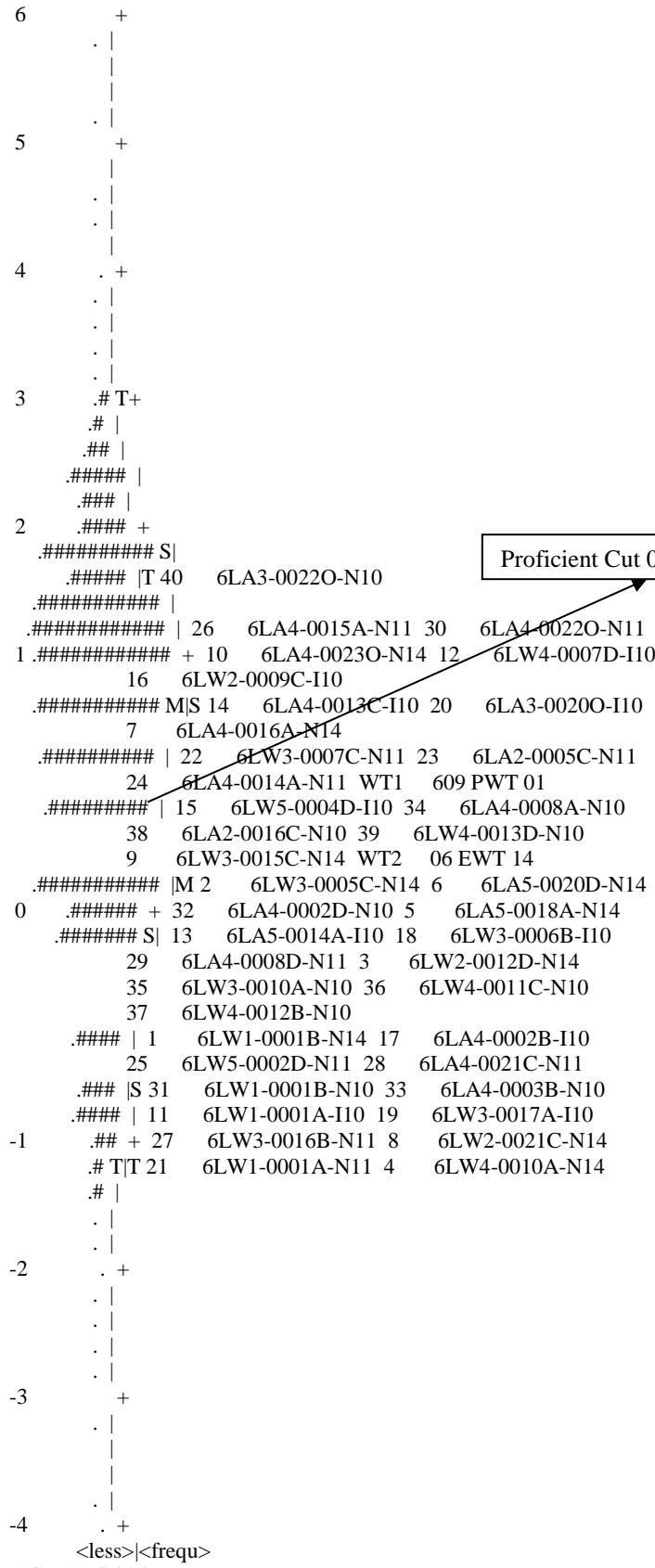
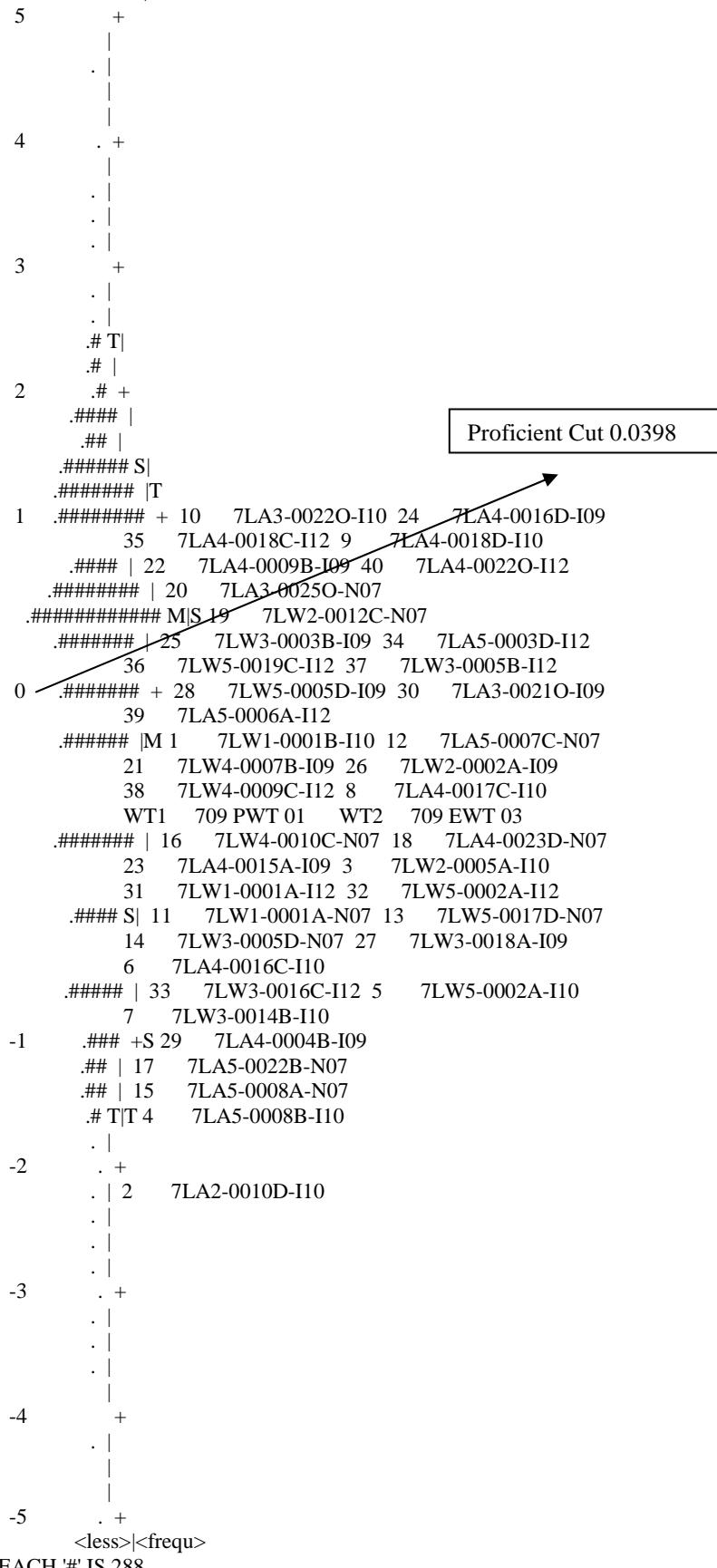


Figure I.4: Item Map LAL Grade 6

PERSONS MAP OF ITEMS

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Figure I.5: Item Map LAL Grade 7

PERSONS MAP OF ITEMS

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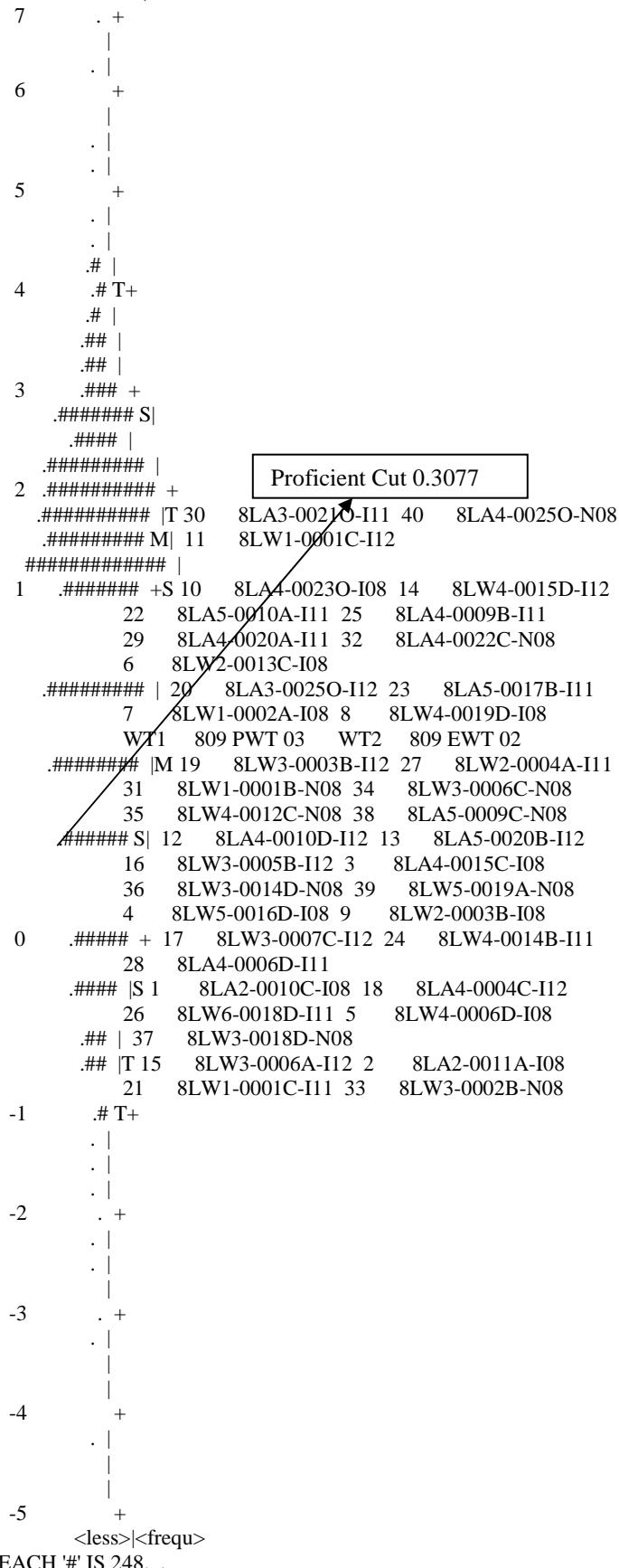


Figure I.6: Item Map LAL Grade 8

Figure J.7: Item Map Math Grade 3

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 1 .##### M+ 29 04M4-04B2-A*CD****-6104C
 36 04M3-04A1-***DE**R-0329D
 39 04M2-04B02-XXXDEX-XG0150A
 6 04M1-X4A06-XXCDEX-XG0364S
 .##### |S 43 04M2-X4E01-AXCDEX-XG0197D
 .##### | 21 04M4-X4C02-XXCDEX-XG0511D
 22 04M2-04D2-***E**R-0316D
 24 04M2-X4A03-XXXDEX-XG0226B
 33 04M4-04A02-AXXDEX-XX0073C
 46 04M3-X4B01-ABDXXX-XG0522O
 .##### | 23 04M3-X4D01-XXXDXX-XX0518C
 45 04M1-X4A05-XXXDEX-XG0249C
 .##### | 12 04M4-04D02-XXCDXX-XX0194A
 41 04M3-X4C02-XXXDXX-XX0211A
 42 04M4-04C2-A*****-4090C
 .##### | 11 04M1-04C02-XXCDXX-XX0159C
 25 04M2-04B2-***DE***-7168A
 3 04M1-X4B10-XXXDXX-XX0387S
 37 04M1-04B4-ABCD****-7009O1
 -5 04M1-X4C02-XXCDEX-XG0395S → Proficient Cut 0.0468
 0 .##### +M 17 04M2-04E2-A**DE***-0324D
 27 04M1-X4C04-XXCDXX-XX0246D
 31 04M1-04B3-***D****-6128D
 .##### S| 16 04M2-04A02-XXXDXX-XX0117C
 19 04M4-04A2-A*CDE***-7159D
 35 04M3-04B1-A**DE***-4114D
 .##### | 38 04M2-X4C01-XXXDEX-XX0410C
 44 04M4-X4D01-AXCDEX-XG0306D
 .# | 1 04M1-X4C04-XXXDXX-XX0396S
 13 04M1-04C03-AXCDEX-XX0092C
 15 04M1-X4B04-XXCDXX-XX0181A
 32 04M3-04D02-XXXDXX-XX0216B
 34 04M3-04D1-***D****-6040A
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 9 04M1-X3A02-XXCXXX-XX0448D
 .#|T 18 04M1-04A6-***D****-3713A
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Figure I.8: Item Map Math Grade 4

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.##### | 24 05M1-X5A02-ABCDEX-XX1698O
52 05M2-C5E02-ABXDEX-XG1177O
.##### | M| 23 05M1-X5C04-XXCDEX-XX1461C
.##### | 11 05M2-X5C01-AXCDEX-XG1471D
49 05M1-X5A04-AXCDXX-XX1791C
51 05M2-C5E02-XXCDEX-XG1628D
8 05M2-05A01-XXXDXX-XG0098S
1 ##### +S 14 05M2-05B02-XXCDXX-XX1402B
18 05M4-05D01-AXCDXX-XX1330C
39 05M3-C5C01-XXCDXX-XX1403C
44 05M2-C5E03-AXXDXX-XX1244D
.##### |
.##### | 34 05M1-C5C01-XXCDXX-XX1795D
.##### | 16 05M4-X5A01-XXCDEX-XX1610B
40 05M4-C5A02-AXCDXX-XX0080A
41 05M3-C5B02-ABCDEX-XG1779O
45 05M3-C5A01-AXCDXX-XX1275D
50 R100022629
6 05M2-X5E01-XXXDEX-MG1706S
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32 05M1-05A01-XXCDXX-XX0138B
5 05M1-05B03-XXXDXX-XX1351S
7 05M4-05C01-AXCDEX-XX1387S → Proficient Cut 0.1482

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2 05M3-X5D01-XXCDXX-XX1729S
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3 05M4-X5B02-XXCDXX-XX1733S
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20 05M1-05B01-XXCDXX-XX0126A
31 R100022653
37 05M4-05C02-AXCDEX-XX1435A
38 05M2-C5D02-XXCDXX-XX1806C
.# | 36 05M3-05B01-AXXDEX-XX1314D
-.# + 48 05M1-05B01-XXCDXX-XX0140B
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Figure I.9: Item Map Math Grade 5

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 ##### | 39 06M2-C6E02-ABXDEX-XG14070
 8 06M2-X6E02-AXCDXX-XX1519S
 ##### | 13 06M3-06B01-AXXDEX-XG1183D
 48 06M4-C6A02-AXCDEX-XG1426B
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 ##### | S 18 06M1-06C03-AXCDXX-XX1354B
 ##### | 19 06M3-X6D01-ABCDEX-XG1432O
 23 06M1-X6A07-AXCDXX-XX1520B
 29 06M1-C6A05-AXCDXX-XX1523C
 35 06M1-C6B02-AXCDXX-XX1395C
 36 06M4-06D03-AXCDEX-XG1259B
 45 06M2-06A08-XXXDEX-XG1319A
 46 06M4-C6C02-AXCDXX-XX1428C
 47 06M3-C6D02-AXCDXX-XX1466A
 ##### | 22 06M3-X6C01-AXCDXX-XX1446C
 38 06M2-C6A02-XXXDEX-XG1459D
 5 06M1-06A07-XXXDXX-XX0031S
 7 06M1-X6B02-AXXDEX-XG1521S
 ##### | 21 06M3-X6A01-XXXDXX-XX1557B
 50 06M4-06C02-ABCDXX-XX0052O
 6 06M2-06A01-XXXDEX-XG1266S
 ##### | M 17 06M1-X6A01-XXCDEX-XG1454B
 0 ##### + 4 06M1-06B08-XXXDXX-XX1263S → □
 44 06M2-C6D02-AXCDXX-XX1537C
 ##### | 41 06M2-C6A01-XXXDXX-XX1400D
 49 06M3-C6C02-AXCDEX-XG1559C
 ##### | S 15 06M2-06C01-XXXDEX-XG1280D
 16 06M3-06D03-XXXDXX-XX1392D
 3 06M4-X6A02-XXCDXX-XX1465S
 34 06M4-06B02-AXCDXX-XX1185C
 40 06M2-C6B01-XXXDEX-XG1524D
 43 06M1-06A08-AXCDXX-XX1362A
 ##### | S 1 06M3-X6D03-AXCDXX-XX1504S
 11 06M1-06B05-XXCDXX-XX1337C
 30 06M1-06A08-AXCDXX-XX1287A
 33 06M2-06E03-AXCDXX-XX1375B
 42 06M3-06A01-XXXDXX-XX1241B
 ##### | 31 06M1-C6B01-XXCDXX-XX1414C
 .# | 20 06M3-06C01-XXCDXX-XX0070D
 -1 ##### + 12 06M1-X6C03-AXCDXX-XX1410A
 14 06M2-06B01-XXXDEX-XG1272A
 37 06M3-C6B01-XXXDXX-XX1505D
 .# | 2 06M3-06A01-XXXDXX-XX1278S
 .# | T
 .# T|
 . |
 . |
 -2 . | +
 . |
 . |
 -3 . | +
 . |
 . |
 -4 . | +
 <less>|<freq>

Proficient Cut 0.0529

Figure I.10: Item Map Math Grade 6

PERSONS MAP OF ITEMS

<more> <rare>	
5	.# + .### + .#### T 3 .##### + .##### .##### .##### 2 .##### S+ .##### .##### .##### T 46 07M3-C7A01-AXCDEX-XG1469A .##### 22 07M4-X7C01-AXCDXX-XX1415D .##### 50 07M1-C7A03-ABCDXX-XX1376O .##### 17 07M4-07C03-AXCDXX-XX1150B 3 07M1-X7A03-XXCDXX-XX1441S 42 07M3-07A01-AXXDXXX-XX1194D 1 .##### + 36 07M3-C7C02-AXCDXX-XX1389D .##### M S 19 100023219O 23 07M2-07E01-AXCDXX-XX0071A 37 07M1-C7A04-AXCDXX-XX1348A .##### 12 07M1-X7C01-XXXDXXX-XX1345B 35 07M2-C7D01-AXCDXX-XX1483B .##### 13 07M1-07B03-XXXDXXX-XX0004B 41 07M1-C7B03-XXXDXXX-XX1424B .##### 18 07M2-X7E02-AXCDXX-XX1463C 31 07M3-C7B01-XXXDXXX-XX1453C 34 07M4-C7A02-AXCDXX-XG1416B 39 07M3-07C02-ABCDXX-XX0052O 43 07M2-C7C02-XXXDEX-XG1478C 44 07M1-C7B01-AXCDXX-XX1535A 48 07M4-07B03-AXCDXX-XX1332B .##### M 4 07M2-X7A02-XXXDXXX-XG1407S 45 07M2-07A01-XXXDXXX-XX1274D 7 07M1-07B02-AXXDXXX-XX0034S 0 .##### + 14 07M2-X7C01-XXXDEX-XG1368A 16 07M3-X7D03-XXXDXXX-XX1410D 21 07M1-X7C01-XXCDXX-XX1480C 47 07M3-C7B01-XXCDEX-XG1512B 49 07M4-C7A01-XXCDXX-XX1504C .##### 2 07M3-X7C02-AXCDXX-XX1432S 32 07M3-C7D02-AXCDXX-XX1414D 8 07M2-X7C01-XXXDEX-XG1487S .##### 11 07M1-07A03-AXCDXX-XX0142D 6 07M4-07C03-XXCDXX-XX0049S .##### S S 15 07M3-X7A01-XXXDXXX-XX1411B 30 07M1-C7A05-XXXDXXX-XX1383A 5 07M3-07D03-XXXDXXX-XX1321S .##### 29 07M2-07B01-XXXDEX-XG1328D 33 07M2-C7A01-XXXDXXX-XX1474B .##### 1 07M4-X7B03-XXCDXX-XX1458S -1 .##### + 20 07M2-07B01-XXXDEX-XG0146A .##### 38 07M4-07D01-AXCDEX-XG0016C .## T .## .## T .## 40 07M3-07C01-ABCDXX-XX1319A -2 . + . . -3 . + . . . -4 . + <less> <frequ> EACH '#' IS 141.

Proficient Cut 0.2490

Figure I.11: Item Map Math Grade 7
NJ ASK 2011 Grades 3-8 Technical Report

PERSONS MAP OF ITEMS

	<more> <rare>
5	.# + .##
4	.## + .### T .####
3	.#### + .#### .#### .#### .#### .#### S .#### T
2	.##### + 38 08M4-C8C01-XXCDXX-XX7315C .##### 19 08M3-X8B02-ABCDXX-XX7305O 39 08M2-08A04-ABCDEX-XG0119O .##### 18 08M1-X8B03-AXCDXX-XX7335A 5 08M2-X8A01-AXXDXXX-XG7354S 8 08M4-X8B02-XXCDXX-XX7386S .##### S 22 8M3B016226D 44 08M4-C8C01-AXCDXX-XX7296C .#### 33 08M3-08C02-AXXDXXX-XG0072D 4 08M2-X8E01-AXCDEX-XG7302S
1	.##### M+ 21 08M2-X8D06-AXXDXXX-XX7369D 3 08M3-08D04-XXXDXXX-XX7229S 35 08M1-C8A02-XXXDXXX-XX7329B 37 8M1C025001C 45 08M1-08B01-AXXDXXX-XX7265B .##### 1 08M1-08A01-XXCDXX-XX0097S 16 08M1-X8B01-AXCDXX-XX7398A 32 8M1A076150B 43 08M1-08C01-AXCDXX-XX0067D 50 08M1-08B04-ABCDXX-XX0056O .##### 7 08M3-08D02-AXCDXX-XX0029S .#### M 41 08M4-08D01-AXCDXX-XG7206D 49 08M3-C8C01-AXCDEX-XG7310A .##### 17 8M2D026305D 23 08M4-08A02-XXCDEX-XG7172D → Proficient Cut 0.2995
0	.#### + 11 8M4A013167D 12 08M3-X8A01-AXXDXXX-XX7320C 2 08M1-X8C01-XXXDXF-XX7205S .##### S 30 08M1-C8A02-XXXDXXX-XX7317A 6 08M4-08C01-AXCDXX-XX0010S .#### S 13 8M3D034101C 29 08M2-08C02-XXXDEX-XG0064B .##### 20 08M3-X8C02-AXCDXX-XX7396A .### 36 8M3A014418B 48 08M4-C8B02-AXCDXX-XX7346B .### 14 08M2-08A07-AXCDEX-XG7240A 47 8M2A035320C
-1	.### + 31 08M3-C8A01-AXXDXXX-XX7363D .## T .## 40 8M2B025835B .# T .# .
-2	+ . . .
-3	+
-4	. + <less> <frequ>

EACH #' IS 153.

Figure I.12: Item Map Math Grade 8

PERSONS MAP OF ITEMS

<more>|<rare>

3	.	+	
	.		
2	+		
	#		
	.## T		
	.###		
	.####		
	.##### S		
	.##### 24	4SB085312O	
1	.##### +		
	.##### T		
	.#####		
	.##### 34	4SB09GXXX	
	.##### M 11	4SB12-035	
	31	4SB10GXXXX-0	
	.##### S 10	4SB02G	
	.##### 14	4SB09GXXX	
	.##### 12	4SEAIU-B09-	
	.##### 22	4SB12GXX	
	29	4SC08G0161-01	
	.### 21	4SA07G0253-	
	.##### S M 18	4SB03GXX	
	.# 19	4SB06GXXXX-	
	4	4SLAIL-A01-003	
0	.# + 20	4SB07GXXX	
	30	4SB10-4221C	
	.#####		
	.# S 15	4SA12G0269-0	
	.# 27	4SA08-5160A	
	6	4SB07-0121B	
	.# T 1	4SB01GXXXX-	
	.# 16	4SC10GXXXX-	
	8	4SA03-2111A	
	.		
		T	
	.		
	.		
-1	.	+	
-2	.	+	
	<less> <frequ>		

Figure I.13: Item Map Science Grade 4

PERSONS MAP OF ITEMS

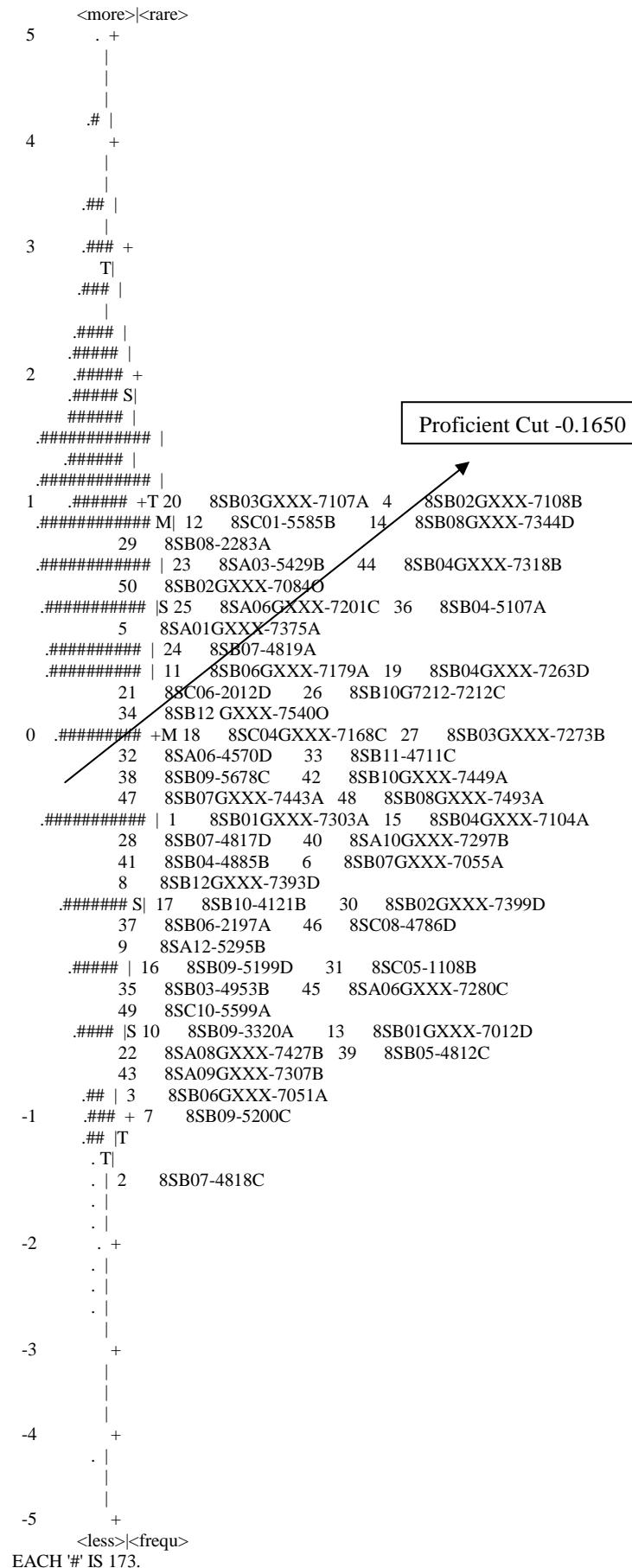


Figure I.14: Item Map Science Grade 8